REFERENCE COPY

NOVEMBER, 1960

RECEIVED NOV 17 1960 ARMY LIBRARY SERIAL RECORD

airlift

WORLD AIR TRANSPORTATION

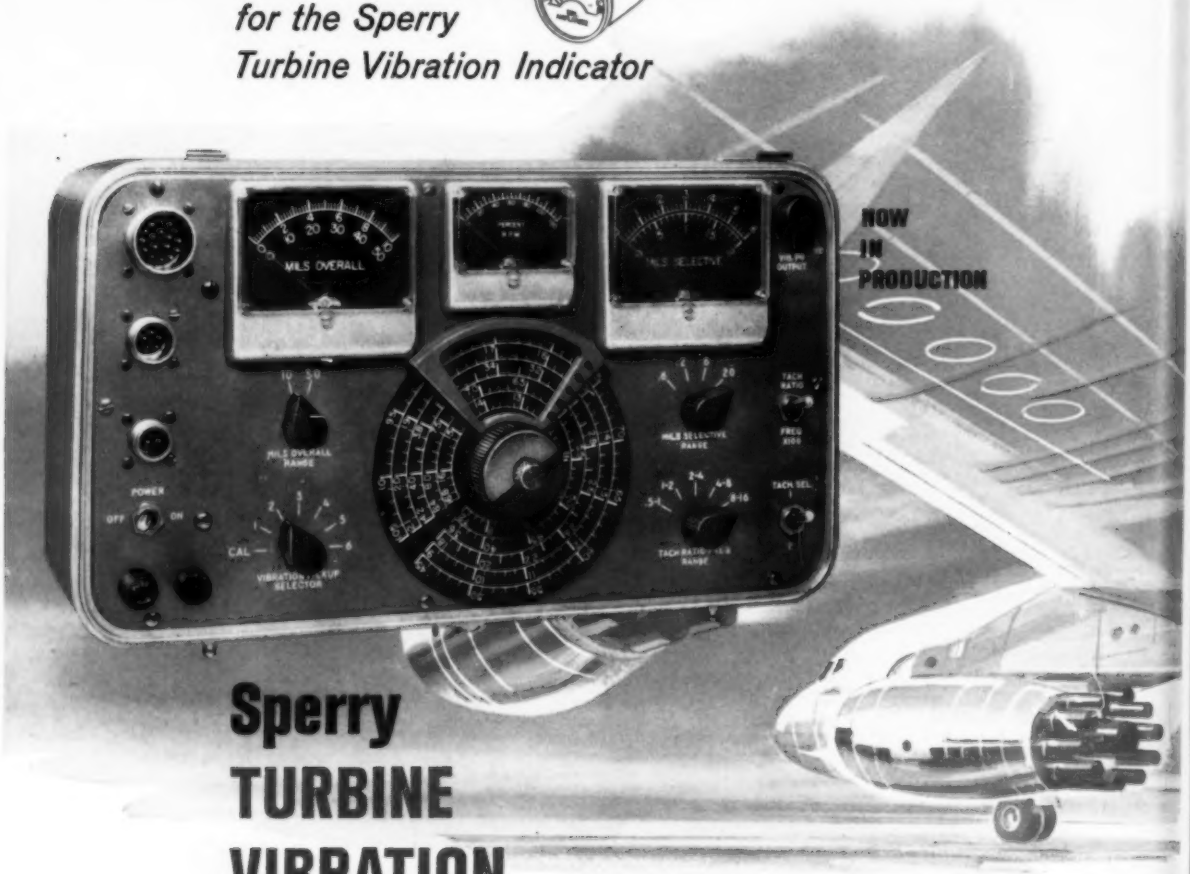
Special Report

Transport Helicopters: a critical appraisal of their outlook . . .

Capsule Interviews

What four U.S. aviation experts saw and learned about Russia's Aeroflot . . .

Ideal complement for the Sperry Turbine Vibration Indicator



Sperry TURBINE VIBRATION ANALYZER indicates source of vibration in Turbojet and Turboprop Engines

• PORTABLE • TRANSISTORIZED
• DEPENDABLE • SIMPLE TO OPERATE

Now in full production, the Sperry TVA —Turbine Vibration Analyzer—is ready to go to work on the flight line or on the test stand. An electronic trouble-shooter for turbojet and turboprop powerplants, the TVA can save hundreds of thousands of dollars for the airlines by locating and diagnosing engine trouble *before* severe damage is done—thus reducing maintenance costs and unnecessary engine removals.

Weighing only 25 pounds, the TVA synchronizes itself by "selective tuning" to each of the engine's major rotating components, and automatically tracks the component's vibration through the range of engine speeds. Any excessive vibration shows up at once, and the component or accessory which is at fault is localized and identified. The mechanic then makes necessary repairs —in a fraction of the time and at a fraction of the cost of trouble-shooting methods of the past.

As a complement to the Sperry Turbine Vibration Indicator, which monitors overall engine vibration in flight, the Analyzer pinpoints the *source* of excessive engine vibration. This TVI-TVA team assures greater overall engine reliability and maintenance economy. It is the only portable and transistorized unit of its kind—and is engineered and built to traditional Sperry standards of quality and dependability. Send for technical data.

SPERRY 50 YEARS

AERONAUTICAL EQUIPMENT DIVISION, *SPERRY GYROSCOPE COMPANY · DIVISION OF SPERRY RAND CORPORATION, GREAT NECK, N.Y.*

TEN MILLION

passengers have already flown in Boeing jetliners
...most popular, most proved jetliners in the world!

These airlines now offer Boeing jetliner service: AIR FRANCE • AIR-INDIA • AMERICAN • B.O.A.C. • BRANIFF • CONTINENTAL • LUFTHANSA • PAN AMERICAN • QANTAS • SABENA • SOUTH AFRICAN • TWA UNITED • VARIG • WESTERN. *Boeing jetliners will go into service later with:* AVIANCA • CUBANA • EASTERN • EL AL • ETHIOPIAN *and* IRISH; NORTHEAST *and* PAKISTAN *operate Boeing jetliners under lease.*

Collins new single sideband transceiver keeps airliners in contact···everywhere

Contact any facility in the world — oceans, even continents away — with Collins 618T HF SSB Transceiver. Talk direct on any one of 28,000 channels with crystal controlled stability.

Collins SSB 618T uses only half the bandwidth, and gives four times the talking power in crisp, clear signals. You're never out of range with Collins new 618T HF SSB Transceiver.

Transistorized and completely modularized, the 618T weighs only 47 lbs. Literature requests will be filled immediately.

COLLINS

COLLINS RADIO COMPANY • CEDAR RAPIDS, IOWA • DALLAS, TEXAS • BURBANK, CALIFORNIA

EDITOR .....Wayne W. Parrish

SENIOR EDITORS
Joseph S. Murphy — Eric Bramley
William J. Coughlin — Anthony Vandyk

ASSOCIATE EDITORS
Robert Burkhardt — Phil Geraci
Richard van Osten — Don Zylstra
Charles Schaeffer — Richard Golden
Wallace I. Longstreth — Gerald Fitzgerald
Brad Dunbar — Jean-Marie Riche
Danna Kusianovich

CONTRIBUTING EDITOR .....Selig Altschul

CORRESPONDENTS
Hans G. Andersson, Sweden; Paulo Einhorn, Brazil; Felipe E. Ezquerro, Spain; R. N. Hughes-Jones, Australia; Douglas S. Clark, Argentina; Wolfgang Wagner, West Germany; Kazuo Takita, Japan; Michael Donne, Great Britain.

ART
Wm. H. Martin, Director .....Joseph L. Phillips

PRODUCTION .....John Walen, Manager

EDITORIAL ADDRESS
1001 Vermont Ave., N.W., Washington 5, D.C.
Phone: Sterling 3-5400 — Cable: AMERAV

BUSINESS STAFF
Ralph R. Theile .....Director of Sales
Elsie Gray .....Adv. Service Mgr.
John H. Carlin .....Circulation Director
George F. Peterson .....Circulation Service Mgr.
Richard Gibson .....Marketing Director
Carolyn DallaValle .....Production Asst.

REGIONAL OFFICES
New York City: 20 East 46th St., Gerald T. O'Mara. Phone: Yukon 6-3900.
Chicago: 139 N. Clark St. Phone: Central 6-5804.
Detroit: 412 Fisher Building. Phone: Trinity 5-2555.
Dallas: 202 Wynnewood Professional Building, Dallas 24, John L. Hathaway. Phone: Whitehall 6-8480, 3-4266.
West Coast: 8929 Wilshire Blvd., Beverly Hills, Calif. Phone: Oleander 5-9161 and Olympia 7-1555.
Florida: 208 Almeria Ave., Coral Gables. Phone: Highland 4-8326.
Geneva: 10 Rue Grenus, Anthony Vandyk. Phone: 32 10 44.
London: 28 Bruton St., Norall & Hart Ltd. Phone: Grosvenor 8356.
Paris: 11 Rue Condorcet, Jean-Marie Riche. Phone: TRU 15-39.
Frankfurt: Freidrich Ebert Anlage 3, Joachim Weissig. Phone: 334810.

SUBSCRIPTION RATES Single copies 50c. For U.S. Possessions, Postal Union and Canada: $5.00 for one year, $8.00 for 2 years, $10.00 for 3 years. Overseas: $7.00 for one year, $12.00 for 2 years, $16.00 for 3 years. Subscriptions limited to aviation industry personnel. For further information, write: Circulation Director, AIRLIFT, 1001 Vemont Avenue, N.W., Washington 5, D.C.

CHANGE OF ADDRESS Send old address (exactly as it appears on mailing label on your copy of magazine) and new address, including zone number if any to Circulation Service Manager, AIRLIFT, 1001 Vermont Avenue, N.W., Washington 5, D.C. Allow two weeks for change.

INCORPORATES Airports and Air Carriers; Aviation Equipment; The American Pilot; Aviation Sales & Services; U.S. Aviation; American Airports; Airports & Heliports and American Aviation. All rights to these names are reserved.

PUBLISHING INFORMATION Published once a month by American Aviation Publications, Inc., Washington, D.C. Printed at The Telegraph Press, Harrisburg, Pa. Second class postage paid at Washington, D.C., and at additional mailing offices.

Wayne W. Parrish .....President & Publisher
Leonard A. Eiserer .....Vice Pres. & Gen. Mgr.
Fred S. Hunter .....Vice Pres. & Editorial Dir.

BPA NBP

Copyright 1960, by American Aviation Publications, Incorporated

NOVEMBER, 1960—VOL. 24, NO. 6

airlift

WORLD AIR TRANSPORTATION

THE INDUSTRY IN BRIEF

Air Transport Trends 17
Industry at a Glance 19, 20

FEATURES

What Four U.S. Aviation Authorities Discovered About Aeroflot 23
Blueprint for a DC-3 Successor 25
Special Feature: Helicopter Outlook 26
Plans Jell for Japanese Transport 35
Is Local Subsidy Here to Stay? 39

FINANCIAL AND STATISTICS

Trunk Equities Still Far Off Form 45
On-Time Boxscore 46
How's Traffic? 47
U.S. Airline Traffic for August 47

ENGINEERING/OPERATIONS

USAF Mulls Douglas Cargo Study 51
Collins Shows Lightweight Weather Radar 55

MAINTENANCE

Industry Disagrees on Jet Overhaul 64

DEPARTMENTS

Personal View 9
Letters 10
Calendar 13
Technically Speaking 49
Pilot Talk 59
About People 61
Equipment World .. 66
Info for the Asking 68
Notes About Suppliers 68
En Route 70

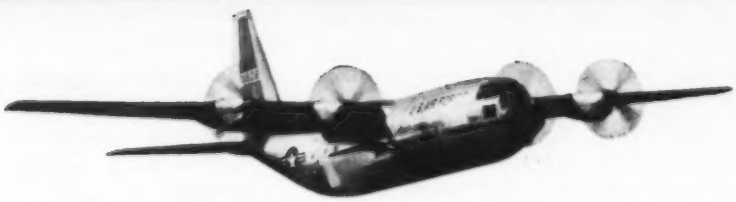
COMING NEXT MONTH—First in an *AIRLIFT* series on supersonic transports, their timetable, design, certification, cost, economics, market, and operating problems such as noise and the sonic boom. This will be a continuing series throughout 1961 written by *AIRLIFT'S* West Coast editor Bill Coughlin. Don't miss, "The Commercial SST . . . When?" in the December issue.

TAC is prepared to stop little wars before they get big

When trouble starts brewing, the Tactical Air Command can clamp the lid on localized aggression before it boils over and spreads to the rest of the world. TAC helps keep the peace in two main ways: (1) with its now famed CASF force which deploys quickly to any world trouble spot to work with local governments and provide air cover and attack strength as might be needed; (2) by establishing and maintaining a strong tactical airlift for Army strike forces, supplies, and support equipment.

The Lockheed/Georgia C-130 Hercules has served with TAC for more than 3 years—and has proved it meets all requirements for true airlift operation: straight-in end loading; truck-bed height cargo floor; air-conditioned pressurized cargo compartment; and ability to lift, land, or airdrop heavy, bulky pieces of freight. And the C-130 can get closer to the action—operating to and from strips much too rough and short for most cargo airplanes.

Lockheed Georgia Division, Marietta, Georgia.



LOCKHEED GEORGIA

WORLD HEADQUARTERS FOR AIRLIFTERS AND CARGOLOADERS

ALL WE CAN OFFER THE AIR CARGO INDUSTRY IS A PRACTICAL WAY TO MAKE MONEY!

CANADAIR CAN PROVE TO YOU THAT:

YOUR piston powered passenger carrying aircraft now rendered obsolete by new equipment, and being considered for use in cargo operations, or already actually converted can be completely removed from fleet inventory and written down to zero book value in three years;

ONE THIRD the number of Canadair Forty Fours will carry out your cargo requirements at such a profit that they will absorb all expenses incurred in the retirement transaction, plus any earnings your piston engine aircraft would have realized during these three years;

AFTER THESE THREE YEARS, the Forty Four operating profit curve will climb steeply. The difference in profit potential for the following years is substantial.

Any consideration of a specific example requires certain assumptions regarding scheduling, future rates, and load factors, but, under a representative set of conditions our analysis indicates: —that a fleet of 25 piston powered aircraft currently being converted into cargo carriers, could be replaced and retired by a fleet of 8 Forty Fours. The above assumptions and statements are based on the unlikely premise that cargo rates will remain at present levels. If they are reduced, as seems inevitable, the situation will favor the Forty Four even more strongly.

THE FORTY FOUR. The Canadair Forty Four, with its combination of low direct operating costs, high block speeds and large payload capacity, is the world's most economical cargo aircraft. Delivery schedules can be arranged to introduce the Forty Four into airline service fourteen months from contract agreement.

CANADAIR LIMITED, MONTREAL, CANADIAN SUBSIDIARY OF **GENERAL DYNAMICS**

New Label on the Same Old Record

THE ANNOUNCED DESIRE of the CAB to help the local service carriers raise equity capital, as expressed in the recent Rate of Return Case, has little if any prospect of achieving the desired result. The reason is clear from the decision itself.

The Board found that the previously prevailing policy on rate of return has "not been sufficient to maintain the financial integrity of the carriers, attract capital on reasonable terms, and provide reasonable compensation to the investors," and that "there is virtually no interest on the part of investors" for local service airline equity securities.

Yet, CAB ostensibly adopted a new rate policy to correct this problem, which for all practical purposes is exactly the same as the old policy. Admittedly, it increased the maximum allowable rate to 12¾% for any carrier that can raise substantial equity. But no local service carrier which has bought modern aircraft can qualify for that now. And, as the Board admits, they won't be able to raise equity until after they have a reasonable earnings history. *The Board has put the cart before the horse.*

So what all this amounts to is the Board gave with one hand and took away with the other. We are back exactly where we started.

There are those who say that the local carriers operate under the protective umbrella of subsidy, and hence should consider themselves fortunate. History proves that *subsidy is a lid on earnings* rather than a guarantee of earnings. To treat subsidized carriers differently from other airlines in establishing reasonable rates of return is the most flagrant discrimination.

The Board, in the recent Passenger Fare Case, decided the smaller trunklines should be allowed to earn up to 12½% return on investment *without* regard to their capital structure. They also are equally entitled to subsidy if needed.

Many of the large aircraft manufacturers derive a higher percentage of their income from the public treasury than do the local service airlines, and their return on investment is not determined by the debt equity ratio.

The carriers are as anxious to raise equity capital as anyone, but, as the Board recognizes, the poor earnings record has made it virtually impossible to do so. This decision purports to correct that by granting absolutely no increase in the effective rate.

Ironically, as a result of this decision, the carriers will be encouraged to keep using all-DC-3 fleets and not improve their efficiency and service by purchasing modern equipment. This is contradictory to one of the principal announced objectives of the Board's decision. The reason, of course, lies in the fact that the only local service carriers which will be able to achieve a 12¾% return are the all-DC-3 operators. Indeed, they will be able to earn even more than 12¾% because their earnings are based on 3¢ per plane mile flown. They will understandably be most reluctant to borrow money to buy new equipment and *reduce* their rate of return.

Here, again, we find a puzzling discrimination. While the Board grants a 33% increase in return for a carrier with low investment (from 2 to 3¢ per plane mile flown), it grants no increase to those who have gone through the rigors of re-equipping with modern equipment.

If the Board really meant what it said, it could achieve the desired result by fixing the minimum return at 12¾% and the maximum at 15%. This would provide the incentive to increase equity capital and at the same time correct the intolerable earnings history which the Board itself describes as not being sufficient to maintain financial integrity or attract capital on reasonable terms.

Minority Opinion

HASN'T THE TIME ARRIVED in this jet era to stop having big public air shows at major airports?

Early September we collided by chance with a big public show at San Francisco International. It was a Sunday. And it was a mess. Traffic was delayed. The terminal was a mass of humanity and confusion. There is nothing in this world which makes a shambles out of an airport as much as a big public show. In Los Angeles where they still haven't altogether grown up out of the days of "aviation," they still insist on a big public show which ties up traffic, jams public restaurants and other facilities, and makes it rough for both passengers and carriers.

There are plenty of airports available for public shows. And public shows can pay off. But we think it is high time to separate spectacles from the business of operating common carrier transportation.

Wayne W. Parrish

for Aviation Products
in the West
it's **PAC**

The West's largest aviation supply and maintenance organization, Pacific Airmotive Corporation is the authorized distributor for leading aircraft parts and accessories:

AC Products
Delco-Remy
Marvel Schebler
Pesco Products
Hamilton Standard
Pratt & Whitney Aircraft
Rolls-Royce
Airborne Accessories
B. F. Goodrich
Exide Batteries
G. E. Bulbs
Meletron Pressure Switches
Holley Carburetor
New York Air Brake
Sonotone Batteries
Pyrotector Fire Detectors
Westinghouse Air Brake
Winslow Aerofilter

B.F.Goodrich

PAC stocks B. F. Goodrich aviation products: Tires, wheels, brakes, fuel and oil hose, tubing, strip seal, de-icers, rivnuts, and others.
Insist on B. F. Goodrich products.

Bendix Divisions:
Filter • Products •
Eclipse-Pioneer • Friez •
Montrose • Pacific •
Pioneer Central • Red Bank •
Scintilla • Utica •
"Scotchcal" Fluorescent Film

These and many other outstanding companies, through PAC, offer complete units, with their replacement parts. Full stocks always available at PAC, its branches and associate distributors.

Also, sale, overhaul and complete service for aircraft, engines, accessories.

Contact your nearest PAC branch.

PAC

PACIFIC AIRMOTIVE CORPORATION

2940 North Hollywood Way
Burbank, California

BRANCHES
BURBANK — 3411 Tulare Ave.
OAKLAND — Int'l Airport
SEATTLE — Boeing Field
HONOLULU — Int'l Airport

PAC MEANS QUALITY IN AVIATION PRODUCTS—SERVICES—FACILITIES

LETTERS

Backtalk on Pilot Salaries

In September, AIRLIFT *published an analysis of airline pilot salaries and crew costs. Not unexpectedly, a few pilots have taken issue with the statistics, some on a broad brush basis, others citing statistics of their own that don't compare.*

The inspiration for the article was a photo of ALPA president, Sayen, at the last general meeting pointing to a curve of increasing wage benefits that looked more like the takeoff path of an ICBM.

AIRLIFT *chose the cost statistics of American Airlines on file with the CAB as the basis for its research. The article reports the results accurately. Perhaps the experience for other carriers differs, but the article was not intended to analyze all airlines.*

Some pilots wholeheartedly agree with the article and have told us so; others, however, do not. Here's what they have to say:

To the Editor:

In the past your efforts to discredit airline pilots have been sometimes subtle and sometimes vitriolic, but usually based on your opinions as they differed from those of the pilots.

Mr. Murphy's article, "Ouch! Pilot Pay Gains Outstrip Everything" in the September *AIRLIFT* really outstrips everything! In turning to the "Here are the figures" routine you have proved very dramatically that figures can be conjured up to prove just about anything. You have set down a very impressive set of figures and drawn some very pointed conclusions. My concern is that neither your figures nor your conclusions approach the truth.

I have before me copies of the American Airlines Pilots Working Agreements for 1951 and the present time. These cover the period of change which you are reporting.

I should like to set down a few figures taken directly from these contracts. In order to establish a basis for comparison I shall use salaries for an eight-year captain earning the maximum salary for 85 hours of flying, one-half day flying and one-half night flying. There were no Electras or Boeing 707s in 1951, so we can only consider Convair 240s and Douglas DC-6s.

Increase only 33%

You state that from 1951 to the end of 1959, pilot pay has risen 97% while other salaries have risen only 56%. The American Airline Pilot Working Agreements show that in 1951 a Convair 240 captain earning the maximum of 85 hours was paid $1,199.30. In 1960 a Convair captain for the same flying will earn $1,586.13, an increase of 33%.

In 1951 a DC-6 captain flying the maximum of 85 hours earned $1,327.65. In 1960 he will earn $1,764.60, also an increase of 33%.

Co-pilot pay increases for the same period on the same basis were on the order of 36%.

If I were to assume that your figures on non-pilot salary increases are correct it would seem that we are somewhat behind our non-flying brethern.

You cite the difference between "block speed" and "peg speed" as an example of how far out of line the pay formula has become. Roughly speaking, peg speed is the actual speed of the aircraft in flight and hence one logical measurement of its complexity, while block speed is schedule speed ramp to ramp. Block speed varies for every flight segment depending on airport congestion, airways routing and other factors. To put it simply, peg speed is what an airplane must accomplish to operate on its block schedule. You are inferring that a pilot is greedy for expecting pay for taxiing to the runway, checking out the aircraft, taking off, climbing to altitude, landing and taxiing to the ramp. If this is portal-to-portal pay, I am for it.

You state that the most obvious example of featherbedding is the third pilot in the jets. I doubt that Mr. Murphy has ever entered the cockpit of a jet airliner during a scheduled flight. How can you consider yourselves authorities on jet aircraft crew complement? One fact which seems to have been lost in this shuffle is that American's management pilots were among the first to recognize the need for the third pilot during the proving runs on the 707. However, that is beside the point, but the figures you quote are not.

You say that Continental's two-pilot-plus-flight-engineer crew costs $93.50 per hour as against $121.50 per hour for American's crew consisting of three pilots and an engineer. This is a difference of $28.00 per hour, presumably the third pilot's pay.

Contract figures differ

However, to show you how really off base you are, I will quote some figures from the pilots contract, using as a third pilot the most senior co-pilot on the airline, who ordinarily would be flying as a reserve captain and certainly would not bid a third pilot trip. His pay as a third pilot at $13.33 per hour would be more than double that of the men who have actually been flying as third pilot.

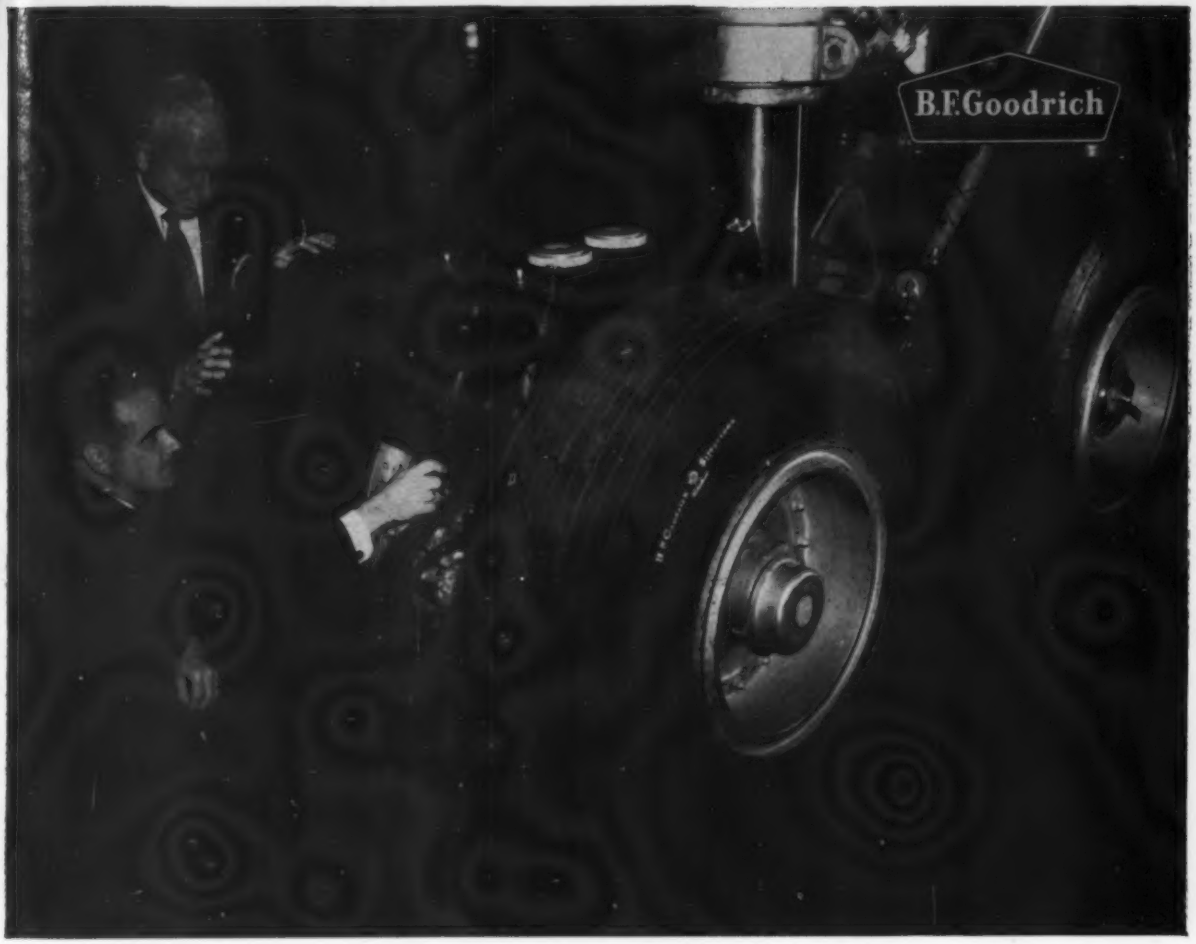
Using the highest paid pilot in each category, an American Airlines 707 pilot crew would receive an hourly pay of: captain $29.72, co-pilot $19.24, third pilot $13.33. Your figures are either somewhat in error or an American Airlines flight engineer is being paid in excess of $59.31 per hour. Would you care to discuss featherbedding further?

Do you think that a supervisory pilot should be allowed to arbitrarily take a pilot's regular trip and cut that pilot's pay a couple of hundred dollars? If a free lance writer has an article published in your magazine, does Mr. Murphy have his pay docked for the period during which the free lancer was preparing his article?

Your little tabulation near the end of the article, on number of pilots and hours flown, is a rather flimsy attempt to show that the pilots are flying about 360 hours a year. You know and I know that this is not true. Any honest research would have shown that the annual figure is closer to 950 hours. Also, for your information, the C.A.R. maximum is 1000 hours.

Most airline pilots are able to accept criticism. We are required by law to be prepared at any moment to demonstrate our competence to an authorized examiner and we do so a minimum of four times each year. Every action we take in an airplane becomes a matter of record, and we must be prepared to justify any action we took on our last trip or last month or last year. In the event that charges are preferred against us we are the only

Continued on page 13



SHORTER, SAFER STOPS FOR JETS WITH NEW BFG LIQUID-COOLED BRAKES

The revolutionary Liquid-cooled brakes developed by B.F.Goodrich have now been engineered for the Boeing 707-720. With completion of flight tests of the brakes on the 707 prototype, kits for equipping airline 707's for service testing and future certification are now being offered.

Tests show maximum temperatures at the brake lining surfaces are held below 500°F, compared to 2000°F in conventional brakes. With temperature and consequent lining wear greatly reduced, these advantages are realized:

- The aircraft can be stopped in minimum distances without ruinous brake damage. Several maximum-energy stops can be made without lining replacement. No restrictions on frequency of brake application are required.
- Aircraft availability is increased, as maintenance is reduced. In addition to the brake linings, life of seals and other brake components will be increased. Damage to brakes, tires, and landing gear from overheating is eliminated.

In the Liquid-cooled brake system, the heat of braking is absorbed by a circulating liquid which is passed through a heat exchanger to remove the heat. Surprisingly, over-all weight is no more than that of conventional brakes.

Liquid-cooled brakes, we believe, are the answer to the high energy braking requirements of large aircraft. Your B.F.Goodrich sales representative can give you further information. *B.F.Goodrich Aviation Products, a division of The B.F.Goodrich Company, Dept. AL-11, Troy, Ohio.*

B.F.Goodrich aviation products

PREDICTION...

JACK & HEINTZ, Inc.

PROVED SYSTEMS AND COMPONENTS FOR BUSINESS AND COMMERCIAL AVIATION

Aircraft will turn to the all-electric VSCF generating system

In reliability, life and operating economy, the Jack & Heintz all-electric Variable-Speed Constant-Frequency Generating System so far outweighs the conventional CSD-Generator scheme for power generation, that acceptance and incorporation of the VSCF on modern aircraft is inevitable.

Basically, the VSCF, as developed by J&H, can take either of two forms:

FULL-RATED FREQUENCY CHANGER: Entire variable-frequency output of a brushless generator is converted to constant-frequency power by feeding the v-f output through a frequency changer.

SYNCHRONOUS FLUX: Rotating field of a synchronous-flux generator is made to rotate at constant speed by superimposing field rotation from an integral frequency changer onto the field rotation produced by the variable-speed shaft.

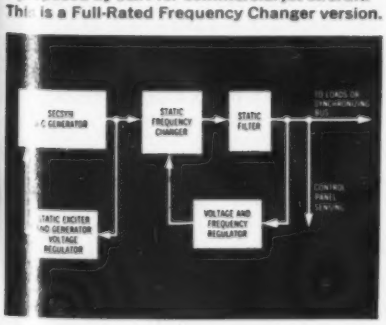
Regardless of which form the application dictates, final reliability, life and operating economy represent levels currently unavailable to airframe manufacturers or airplane operators:

RELIABILITY/ECONOMY—The only moving/wearing parts of the J & H all-electric VSCF are bearings. This design means much higher reliability. Based on current statistics, the VSCF will reduce maintenance/overhaul costs by more than 75%.

LIFE—Anticipated time between overhaul for a VSCF with oil-lubricated bearings is placed at 5000 hours.

The VSCF has still another major inherent benefit. The system can be employed for engine starting from an electric GPU, eliminating use of air-start equipment.

Block diagram of VSCF Generating System proposed by J&H for commercial jet aircraft. This is a Full-Rated Frequency Changer version.



Continued from page 10

people within my knowledge who are presumed guilty until proven innocent.

We are faced with a hodge podge of regulations so contradictory that it is nearly impossible to fly a trip without violating something. We are required by law under certain circumstances to violate regulations, but in so doing we are immediately subject to charges and punitive action. We feel we earn our salaries.

Yes, most airline pilots are able to accept criticism. Factual reporting of controversial issues could be considered constructive criticism. We therefore welcome factual reporting of anything which concerns us, including conclusions drawn from accurate figures. However, your article represents not factual reporting or even honest conclusions drawn from careless research. This article is, in my opinion, an example of gross misrepresentation with malicious intent and amounting morally to libel. As such, I am personally offended by it.

ROBERT D. THOMAS
Captain, American Airlines

Ed. note: *We can only repeat*—AIRLIFT's *statistics were accurate. They, however, were not based on salary figures in the contract but on what it costs American Airlines to cover crew expenses. If there is any issue to be taken with them, it would have to be a condemnation of the information required by CAB and filed by the airlines.*

More Brickbats

To the Editor:

This is the second letter I have written you. In the first I wholeheartedly agreed with your labor policies and you even published my letter, at some embarrassment to myself. This time, however, I regret to say I am not in agreement with your policies.

I will not attempt to correct any of the half-truths and misinformation in your Sept '60 issue concerning the pilots and the ALPA. This can be done better by others and I am sure it has been done. Furthermore I suspect that you already know all of this but find it more advantageous to take the side of the ATA.

The present attempts by the ATA, its members, and its press to downgrade the airline pilots can have nothing but disastrous effects for all concerned. The airline pilot group is very unique. It contains, as you must known, men from all walks of life. We have taxi drivers and pipe fitters, generals, lawyers, PHD's and top management in our group (I am a graduate zoologist). You must know that you cannot fairly, categorically, condemn a composite group like this and conveniently call it "labor."

If present attempts to downgrade the pilot are successful there can only be one result. The profession will fail to attract the high grade of men it has, in most cases, attracted in the past. It will become less and less desirable to the man with whom you can trust five million dollars worth of equipment and 100 plus lives.

Technology will never replace human judgment where a unique, instantaneous decision is required. If it ever does, I feel sorry for management. Their jobs are more easily replaced by a computer because human lives are not directly involved in their decisions.

I suggest that you take a long look at the ultimate results of your policies in this matter. Any man who can think deeply for a few moments knows, for obvious reasons, why we will never have unmanned, automatic, passenger-carrying airborne conveniences, whatever their nature. There must be a highly trained, intelligent man on board who can operate the machine when necessary.

If the present trend which threatens to lower the status of the airline pilot job continues, the job will not appeal to the right type of person. Once again, I must say that it does not require a great deal of thought to see the ultimate result; more unexplained accidents as aircraft become faster and more complex.

A human problem

Both government and industry will find these accidents difficult to eliminate because they will be caused by human stupidity, a factor which they will find very puzzling. They have not had to deal with it in the past and it can not rationally be dealt with except to eliminate it. For an industry completely dependent on public trust and acceptance, the situation will be very sad, indeed.

I am not going to be hasty and cancel my five-year subscription, as I hope none of the other 15,000 ALPA members will do. However, I am going to begin taking a longer look at your policies in the future before accepting them as fast. Just as is so commonly true in the lay press, when a person finds an error in fact or policy on a subject with which he is familiar, then he looses some of the faith he had in the organ on other subjects.

R. F. O'NEIL
Captain, North Central Airlines

Ed. note: *We are at a bit of a loss to comprehend the precise origin of Capt. O'Neil's wrath, but presume his task taking is rooted in the Pilot Salaries appraisal also. We nevertheless respect his sacred right to comment within our pages, and welcome his opinions. We have never sought to condemn pilots as a group, and don't intend to start now.*

When & Where

NOVEMBER

Nov. 1-2—Radio Technical Commission for Aeronautics, fall meeting, Sheraton-Park Hotel, Washington, D.C.
Nov. 2-4—10th Aircraft Hydraulics Conference, Pick-Fort Shelby Hotel, Detroit, Mich.
Nov. 3-4—Northeast Chapter, American Association of Airport Executives, annual fall meeting, Sheraton Inn, Binghamton, N.Y.
Nov. 7—IATA, traffic conference 2 agency committee, Athens.
Nov. 7-18—American University, 14th annual air transportation institute, Washington, D.C.
Nov. 12-19—American Society of Travel Agents, 30th annual convention and world travel congress, Honolulu, Hawaii.
Nov. 14-16—National Aeronautic Assn., national convention, Indio, Calif.
Nov. 14-18—Flight Safety Foundation, 13th annual international air safety seminar, Phoenix.
Nov. 15-17—ATA, purchasing committee, American Hotel, Bal Harbour, Fla.
Nov. 15-17—Aviation Distributors & Manufacturers Assn., 36th meeting, Riviera Hotel, Palm Springs, Calif.
Nov. 17—ATA, Public Affairs Committee, ATA conference room, Washington, D.C.
Nov. 22—IATA, technical committee, Rio de Janeiro.
Nov. 28—IATA, 5th public relations conference, Estoril, Portugal.

DECEMBER

Dec. 5-8—National Aviation Trades Assn., Biltmore Hotel, Oklahoma City.
Dec. 7—ATA, board of directors meeting, ATA conference room, Washington, D.C.
Dec. 8—ATA, membership meeting, Federal Room, Statler-Hilton Hotel, Washington, D.C.
Dec. 17—Wright Brothers Lecture, National History Bldg., Smithsonian Institution, Washington, D.C.
Dec. 17—Wright Memorial Dinner, Sheraton Park Hotel, Washington, D.C.

Convair 540 Conversion with Napier Jet-Prop Engines

Convair 540s undergoing modification with Napier Jet-Prop engines at AiResearch Aviation Service, the most experienced company in the modification of pressurized aircraft.

AiResearch Aviation Service converts Convair 340s and 440s into high performance airliners and executive aircraft with Napier Jet-Prop engines specifically designed for the Convair 540.

With over-weather cruising speed of 326 mph and payload (range capacity of 60 passengers for 800 miles or 10 executives transcontinental nonstop), the Napier Jet-Prop 540 provides a smoother ride at greatly reduced noise levels and improves economy of operation in airline or business transport.

An AiResearch auxiliary gas turbine installation (optional equipment) makes the Convair 540 self-sufficient on any landing strip. The on-board unit provides complete engine starting and all power for ground air conditioning and preflight checkout.

Installation of the 3500 eshp Napier "Eland 504" Jet-Prop engines with four-bladed propellers includes structural modification to engine nacelles, new instrumentation, and electronic and radio system modification in minimum down time.

Conversion of Convair 340s and 440s to Napier-powered Jet-Prop 540s is performed exclusively at AiResearch Aviation Service, the most experienced company in the modification of Convair 240s, 340s and 440s into executive aircraft and luxury airliners.

Employing more than 600 of the most highly trained and experienced engineers, technicians and craftsmen in the industry, AiResearch performs all design, engineering, fabrication and installation work in one location to meet the conversion, modification, maintenance and overhaul requirements of any aircraft.

Write, wire or telephone today for complete information regarding your Convair 540 conversion with Napier Jet-Prop engines.

Customer confidence is our most highly regarded asset

THE GARRETT CORPORATION AiResearch Aviation Service Division

International Airport, Los Angeles, Calif. / Telephone: ORegon 8-6161

UNIFORM SHOWN: 55% "DACRON" POLYESTER FIBER, 45% WOOL.

"DACRON"...FOR HANDSOME, DURABLE, MONEY-SAVING UNIFORMS!

Lasting neatness, comfort, economy... they're all yours in uniforms containing "Dacron"!

Uniforms of "Dacron"* polyester fiber and wool bring new comfort, new and lasting neatness, real durability to airline personnel. Flight and ground crews stay neat through the hardest days (even in the rain), thanks to the wrinkle resistance, press retention of "Dacron". And, thanks to the real durability of "Dacron", replacement costs are cut. Uniforms containing "Dacron" are extra-comfortable, too . . . lightweight for warm weather, warm for colder days. Save money, keep your crews looking great . . . see your supplier soon!

Du Pont's registered trademark. Du Pont makes fibers, not fabrics or clothes.

DU PONT
REG. U.S. PAT. OFF.
Better Things for Better Living . . . through Chemistry
DACRON®
POLYESTER FIBER

Now!

BRANIFF

serves

MEXICO

direct...

with

famed

Silver Service®

*flights**

Prepare your customers to be pampered when they fly Braniff's Silver Service flights to Mexico. They'll enjoy the finest of foods and beverages . . . best of extras such as vintage champagne . . . mouth-watering hors d'oeuvres from the serving cart . . . unrivaled hospitality and personalized service . . . truly the finest service aloft—a tradition with Braniff.

Direct through-plane to Mexico City from Minneapolis/St. Paul, Kansas City, Dallas and San Antonio. Excellent connections on Braniff from most other Midwest and Southwest cities.

Both first class and tourist service.

Braniff serves more major cities in the U.S.A. and Latin America than any other airline.

BRANIFF
International
AIRWAYS

General Offices: Dallas, Texas

**Starts November 9*

AIR TRANSPORT TRENDS

Subsidy

Watch for another subsidy increase. Helicopter lines and Alaskan carriers are fairly stabilized, but local service industry is still getting big route awards from CAB, will need more money. Congress okayed $65 million total subsidy for this fiscal year. One forecast: CAB will ask $81-$85 million next year.

FAA

FAA's wings may be clipped. Sen. A. S. Mike Monroney (D.-Okla.) is heeding protests about rulemaking-without-hearing. His three-pronged plan: establish a system of FAA hearing examiners, hold legislative-type hearings in rulemaking cases, make the Administrator the "court of last resort" in appeals rather than an initiator of regulations. Purpose of Monroney announcement may be to prod FAA into making changes on its own, thus eliminating need for Congressional action.

Fares

Jet coach fare increase is expected to spread. CAB has allowed American, TWA, Continental, United, Northwest to raise coach to 75% of first-class on routes from east and midwest to west coast. Increases range from 7.6% to 17.8%. One carrier estimates that new fare will boost its revenues $7-$8 million next year. Eastern and National have now filed for increase, others are expected to follow. Including $10 surcharge, New York-Los Angeles jet coach is now 76.3% of first-class.

Equipment

Turboprop/turbofan cargoplane battle is on again. Canadair, with turboprop CL-44, is citing eight-point advantage over turbojets or fans. Boeing soon will release results of study designed to erase turboprop from competitive scene once and for all. Rand Corp., Air Force's research arm, concludes there is a remarkable parity of costs between the two, that decision must rest on other factors such as engine availability, operating conditions, customer preference.

Technical

Look for stronger stature for engineering/maintenance in ATA. No small influence in pressures for a change is impact of such technical decisions as aircraft performance rulemaking or engine overhaul administration on economics of jets. Recent need for airline presidents to meet with FAA Administrator Quesada on highly technical topics emphasizes shortcomings of present ATA organizational structure. Several airlines technical officials favor an ATA v.p.-engineering and maintenance instead of existing "divisional" status.

Noise

Cost of jet noise supression is high. Recent figure quoted for U.S. airlines is $1.7 million monthly, or more than $20 million a year, including payload losses, added fuel, repairs, etc. Another estimate is $93,000 per year per jet, which would place current annual industry bill at about $14.2 million.

Supplementals

Supplemental carriers will continue with two trade groups. Insiders admit only one is needed; merger would help industry present united front on Capitol Hill. But hopes have dimmed that Independent Airlines Assn. and Supplemental Air Carrier Conference might get together.

CARAVELLE

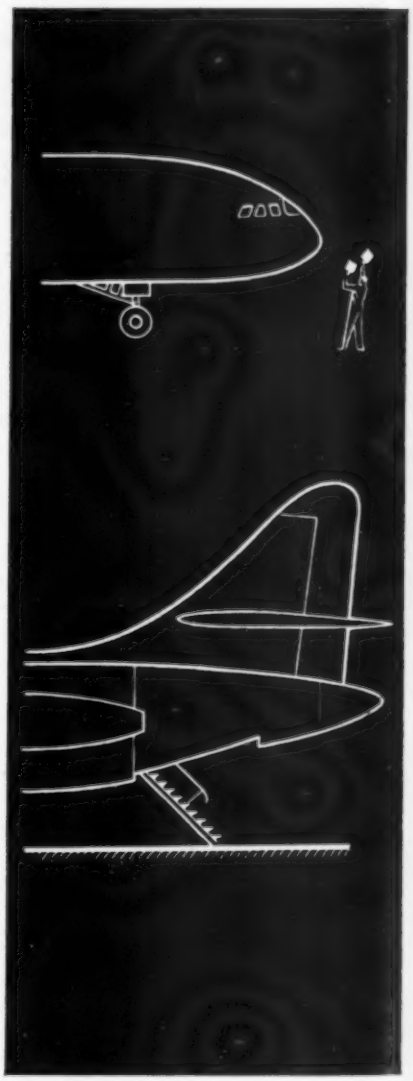
The finest medium range jetliner the world over

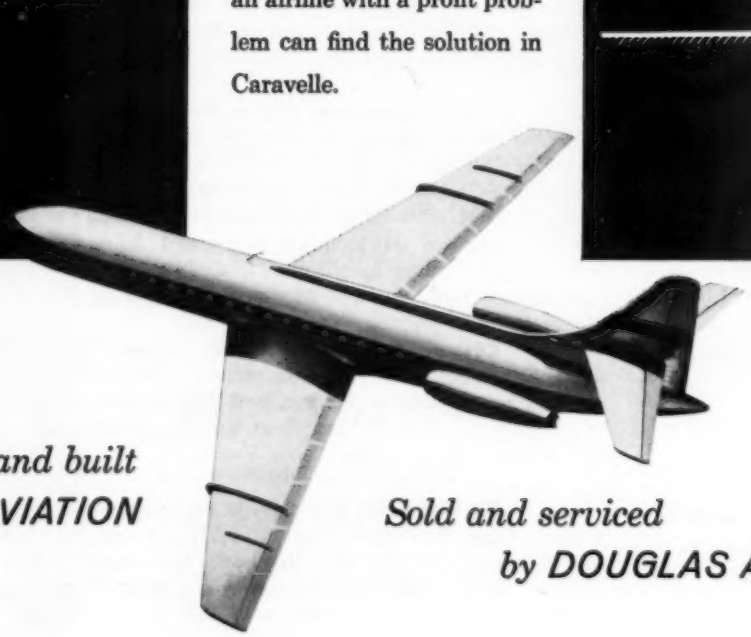
Self supporting from the time it's born

Caravelle is the only airliner that can fly into an airport, unload and load passengers and take off again without the aid of airport ground equipment.

It does it with integral loading stairs, the ability to start its jets from its own batteries and the capability of making many en route stops without refueling.

Caravelle is self-supporting in more ways than one... it makes a profit carrying as few as 28 passengers! Many an airline with a profit problem can find the solution in Caravelle.

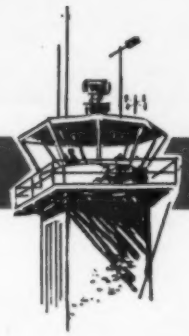




Designed and built by SUD AVIATION

Sold and serviced by DOUGLAS AIRCRAFT

INDUSTRY AT A GLANCE



EQUIPMENT

Prospects and promises overshadow purchases, in new transport sales arena. United's planned order for 40 727s, discussed openly by UAL president, W. A. Patterson, since February, will be anticlimactic when it becomes official. Eastern's identical buy of 727s falls in the same category. Together, they represent better than $280 million in business for Boeing.

Lufthansa will expand. West German carrier expects to put about $163 million into new equipment including expansion of its Boeing 707/720 fleet, a new short/medium-range jet and possibly some CL-44 turboprop freighters. With $154 million already spent for turbines, its equipment investment would exceed $300 million.

Firm orders are still scarce. Eastern Air Lines' upward revision of its 720 order from 10 to 15 is the only major transaction in a month . . . Iberia, Spanish airline, will buy four Caravelles and expects government aid shortly. Delivery: early 1962 . . . Sabena has ordered two additional Caravelle VIs bringing its total order to six.

New prospects for Caravelle. Continental Air Lines and American, in that order, are being tabbed as hottest new prospects as Caravelle customers. Continental reportedly wants up to 15; American buy, if it comes, would be about 40. Both involve GE engines—CAL's the Caravelle VII and AA's the bigger and faster model XIV.

Braniff, also a Caravelle candidate, is understood to want four changes in the French twin-jet if it buys: a revised electrical system, changes in pressurization and air conditioning, and cabin windows set higher.

Big used-plane deals. Riddle Airlines enters the big transport competitive scene with a purchase of seven former SAS and Swissair DC-7Cs from General Dynamics Corp. It will pay Douglas about $300,000 each for modification to a convertible passenger/cargo interior for use in transatlantic passenger charters and potential MATS contract business.

Trans-Texas Airways, one of the last of the locals to re-equip, is buying seven American Airlines Convair 240s and optioning 15 others in a deal approaching $3 million . . . Buyers for Continental's two Viscounts (*AIRLIFT*, October) are Ansett-ANA Australian Airline and Tennessee Gas Transmission Corp.

More Eland Convairs. Napier Engines, Inc. is converting five more 340s to Eland turboprop power on speculation, has turned them over to AiResearch Aviation Service to handle the modification.

SAFETY

Lockheed's Electra is still going strong, despite the variety of unrelated mishaps it has encountered since its introduction. Load factors continue to run high following its recent "bird" incident at Boston, in some instances 100% on flights out of that city the following day.

Of the five Electra accidents on record, only two are related to the aircraft and these are of a nature unprecedented in transport design. Two at New York's LaGuardia Field can be attributed in part to airport conditions, one of insufficient approach lighting and the other of an approach obstruction in the form of a dike surrounding the airport.

Whatever the outcome of the most recent Electra accident, and bird ingestion looms as a big factor, the Lockheed turboprop is being called upon to weather adversities to which other types might long ago have succumbed.

Probably the biggest reason for its success in this is the Electra cockpit—a "pilot's cockpit" and one that to date has offset, among pilots who fly it, the impact of miscellaneous causes for the accidents it has suffered. One can look to pilot safety groups to take an increasing interest in protecting the Electra against exposure to future take-off incidents by use of less dramatic climbout techniques than those of which it has proven itself so capable.

MERGERS

Merger case pushed. The United-Capital merger now promises to be one of the most streamlined cases in CAB history.

Hearings were being held to a minimum, issues of suspending part of Capital's routes or transferring them to other carriers were ruled out, and CAB's Bureau of Air Operations did not even participate

in the proceedings (but may submit a brief later). Stockholders of both companies overwhelmingly approved the deal.

Testimony by Capital and United was blunt: Merger is the only salvation for Capital. Its loss for the first nine months of 1960 reached $8.2 million. There's serious doubt that cash will be available to operate through next January or February. With the speedup, it seems evident that CAB will reach a decision well before that time.

LABOR

Flight crew unemployment. Flight engineers union is losing as many members through furlough in first year and a half of jets as it expected to lose in the entire jet switchover, says FEIA. About 10% of membership is on furlough and the union estimates a slightly higher percentage for pilots. So far, 336 engineers and 819 pilots have been dropped by American, Eastern, Pan Am and TWA.

Two strikes end. Long strike of flight engineers against Continental is over. CAL insisted all three members of jet crews be pilot-trained. Agreement provides engineers will be integrated into ALPA seniority list instead of being placed at bottom. At Braniff, Brotherhood of Railway Clerks won't get union shop but will receive $3.5 million wage increase over next three years. Walkout lasted 10 days.

An engineer is required. Riddle Airlines plea for exemption to operate the Armstrong-Whitworth Argosy freighter with two pilots is rejected by FAA. Aircraft exceeds 80,000-lb. dividing line above which rules call for a flight engineer. Riddle sought relief on basis that Vickers Viscount, which uses same engines and carries passengers, requires no engineer.

MANAGEMENT

TWA financing hits a snag. A bulky Howard Hughes' refusal to agree to conditions for placing his TWA stock in a voting trust has delayed the airline's major financing program.

Since resignation of Charles Thomas from TWA presidency last July, insurance firms and banks have been insisting that some deal must be made to insure management stability before they come through with their $168.8 million share of the $318.8 financing.

Hughes agrees in principle to relinquish control by putting his stock (78% of TWA's total) in trust, but won't accept the terms. He may try for new agreement with the lenders or explore new avenues. Meanwhile, 19 TWA Convair 880s (the airline has one) remain undelivered. Some have been parked at San Diego for months.

FAA

North Atlantic traffic under study. FAA is inviting four countries—Canada, U.K., Ireland and Portugal—collect data on peak day transatlantic air traffic for one year. FAA hope is to obtain and analyze traffic data upon which to base recommendations for ATC system needs in 1965-1970 period.

ASDE installations begin. Airport surface detection equipment (called ASDE, or taxi radar) has been installed at Newark and New York's Idlewild airport. Eight other units will be installed, one per month, at Boston, Seattle, Washington-National, San Francisco, Cleveland, Los Angeles, Portland and Washington-Dulles. Equipment is built by Airborne Instruments Lab, Div. of Cutler-Hammer, Inc.

FAA will test BLEU, British-built "Blind Landing Experimental Unit" using a leased DC-7 next spring. Agency's Bureau of R&D hopes to complete evaluation of two other systems, Bell's AN/GSN-5 in November and North American-Autonetics AN/ARN-114 early next year. Most "sophisticated" of the automatic landing systems, Gilfillan's REGAL, will continue under evaluation by FAA for some time.

1960 FAA Statistical Handbook of Aviation is off the press. Order from Supt. of Documents, Government Printing Office, Washington 25, D.C. Price: 60 cents.

AIRPORTS

Property management symposium. Univ. of California will conduct "short course" on airport property leasing, zoning, financing, fiscal control, user charges and capital improvement program. It will be held Dec. 1-3 at Fresno State College, Fresno, Calif.

SIDELINES

BOAC starts New York-London all-cargo service this month, twice weekly with two converted DC-7s . . . **Aero Commander Inc.** is new corporate name of Aero Design & Manufacturing, which says the change will more closely associate the company with its product, the Aero Commander executive aircraft . . . **United Air Lines** loses its registration of "red carpet" as a result of Patent Office action. National Airlines claimed this description of luxury service is in the public domain . . . **CAB examiner** says Eastern's designation of DC-8 with J75 engines as DC-8B is not misleading, as claimed by Delta . . .

John Mahoney will return to Seaboard & Western as senior v.p. and a director, after serving as Capital's v.p.-marketing services. He was v.p. of S&W before joining Capital . . . **Robert M. Ruddick,** v.p. and asst. to president of United, moves Washington to Chicago to direct community relations and publicity.

POWER TO FLY...POWER TO PROTECT... by Pratt & Whitney Aircraft. Today the Strategic Air Command's Boeing B-52 bomber has a new profile. Inboard from its J-57 turbojets, two more Pratt & Whitney Aircraft jet engines have been added...a pair of J-52s. These engines power the North American Hound Dog guided missile, designed to deliver a nuclear warhead behind enemy lines at supersonic speed. And for faster take-off, the power of the twin Hound Dogs augments the thrust of the B-52's eight J-57s. Aloft, both the bomber and its Hound Dogs can be refueled from aerial tankers. The application of the J-52 jet engine to the Hound Dog missile is another example of Pratt & Whitney Aircraft's expanded activities in new fields of power.

Pratt & Whitney Aircraft East Hartford, Connecticut / A Divison of United Aircraft Corporation

Dear American Airlines:

I am the store coordinator for a national chain. Name the airline and I've flown it. For courtesy, service and expert pilot ability my hat's off to your line, the number one airline in my book

Harry Hillard

AMERICAN AIRLINES

UNSOLICITED IN-FLIGHT LETTER FROM MR. H. HILLARD, NATIONAL STORE COORDINATOR, BAYCO AUTO SEAT COVER CO., PARAMUS, N. J.

Our Pilots, Mr. Hillard, are another of the reasons why American Airlines is first choice of experienced travelers. There are 1,750 of them; many are 15 and 20-year veterans — multi-million-mile Captains. Each follows a rigid apprenticeship with continuing company and government examinations. They are the elite of the Jet Age.

AMERICAN AIRLINES
America's Leading Airline

What four U.S. aviation authorities discovered about

АЭРОФЛОТ*

**AEROFLOT, Russia's state-owned airline*

Elwood R. Quesada
Administrator, FAA

BY OUR STANDARDS, Aeroflot is an "antiquated" commercial aviation system which would not meet safety standards for New York-Moscow service even if negotiations could be resumed and a bilateral negotiated.

The Russians appear to be making the same mistake we made by not anticipating the heavy traffic of the jet era.

Resumption of bilateral talks with the USSR still is blocked by the RB-47 incident, despite the fervent desire of Aeroflot officials for an exchange. The Soviets are working like beavers to come up to U.S. operation and maintenance standards.

The IL-18 turboprop is by far the best in the Soviet hangars, but it has been plagued by engine trouble—fuel injection problems—and apparently has been grounded for a retrofit program. Nonetheless, it is a very good airplane.

The Tu-104 jet, by contrast, is a prohibitively uneconomical transport by US standards, and has stick control forces similar to the B-17. The Soviets have this airplane coming out their ears and are using them the width and breadth of their country to very good effect, especially over the vast expanses of Siberia.

The Soviets are obviously both interested in and reluctant to talk about a supersonic transport. They probably will have a less-than-mach 2 machine, perhaps within five years.

Although Aeroflot has equipment roughly comparable to our ILS and GCA at Moscow "international," British European Airways must line up two simple radio beacons there and home on them. A U.S.-type, British-built ILS is on the way.

At smaller airports navaid and passenger facilities are crude by western standards. Traffic control is antiquated, airline maintenance often "meager."

An approach lighting system which is very good is the only aspect which begins to approach western standards, but it is not available at every facility.

Fourteen round trips daily between Moscow and Leningrad represent the heaviest single route. Load factor goal is 80 percent.

The Soviets are working hard to modernize. Moscow facilities might be brought up to acceptable standards in six months, but modernization elsewhere will take years.

If Moscow does manage to catch up as an international hub, it still must stand alone, without an adequate weather alternate.

Stuart G. Tipton
President, ATA

THE RUSSIANS HAVE LOST a lot by being provincial and secretive and by not joining the world airline community.

There are very definite questions about the relationship of their planes to our performance requirements. It will be quite a new experience if and when we negotiate a bilateral agreement with Russia.

Other countries with whom we have agreements are members of IATA and ICAO and we have an exchange of information on performance. We don't have this with Russia.

This points up the value of IATA and ICAO in increasing standards, not only through the papers they issue but also by forums. These may not always be formal forums, but may be bull sessions in hotel rooms, cocktail lounges, or somewhere else. One airline may say, "We're having a hell of a time with piston rings." Another will say, "We think we've solved our problem and here's what we plan."

Such exchanges take place all the time. It's hard to conceive of the Russians entering into such discussions. But I think the Aeroflot people are conscious of the fact that they've been missing something.

When the Russian delegation was in the U.S., I tried to give them a picture of our airline industry—passengers carried, passenger-miles, freight, number of planes, etc. This was one of the things I wanted from them during our visit, and it was one of the things I didn't get. They are remarkably secretive. We were given no figures on the number of passengers carried, or the number of planes in the fleet.

Their presentations were generalized, covering organization, percentage increases expected under the 7-year

QUESADA

TIPTON

DUNN

LYNCH

plan—but they didn't tie the percentages to actual figures. We finally got some information on their fare structure, which is tapered from 30 kopeks a passenger-mile down to about 12 kopeks. Of course, it's hard to convert these figures into U.S. money.

I think one reason the Russians were so secretive was because so many things are classified that they were not sure what they could tell us and what they couldn't—so they were afraid to talk.

From the several rides we had on Aeroflot, mostly in Tu-104's and Il-14s, my impression is that the airline service is kind of primitive. Cabin interiors are poor, oxygen equipment is out in the open, stewardesses are poorly dressed, and pressurization is punk. Seats are comfortable enough and the meals are good. Load factors, incidentally, are very high.

When the Russians felt their facilities were not up to snuff, there was a very great reluctance to show them.

The Russian airline system is well behind ours. But there is manifestation of a great deal of drive within Aeroflot. They're coming fast with a very considerable determination to make it a tremendous airline.

R. M. "Ray" Dunn
V.P.-Technical Services, TWA

RUSSIA'S AEROFLOT is the least "hangared" airline for its size. By U.S. standards it has an operating atmosphere typical of the late '30s.

The big departure from this 25-year-old image, of course, is speed. But the Tu-104 and other Soviet transports give one the impression of design for "beef."

Even with the buried engine installation in the Tu-104, simplicity predominates. With the cowls open there appeared to be about 18 to 20 in. of working area around the engine. Jet accessories are not generally mounted on the engine, but appear to be remotely located.

Components bear a striking resemblance to U.S. designs, fire detectors look like Edison units, valves resemble AiResearch components. There was a noticeable absence of hydraulic or electronic test gear typical of U.S. maintenance operations.

Machine shops, however, are well equipped and, although obviously of old types, they appear of high quality. One airline shop quite foreign to the U.S. scene is a rubber department which produces O Rings and gaskets for all needs. For ramp operations specialized equipment is not evident. An ordinary stake truck is used for towing.

The I1-18 accident was caused by combustor nozzle flame impinging on the wall of the combustor, burning a hole through the can and causing a wing fire. The aircraft will be back in operation soon, they say, although many were seen on the ground, some covered with huge tarpaulins. Several were seen flying, apparently on test operations.

Emphasis in design seems to stop far short of U.S. tendency toward automatic control and exotic design. Pressurization does not appear to be automatic and no flight-control boost is used.

W. Waldo Lynch
Asst. V.P.-Communications, PAA

RUSSIA'S TU-104 JET, the only one I had an opportunity to fly, isn't in the same ballpark with any of the U.S. jets. Control stick forces are heavy but the response is positive.

Russian pilot takeoff techniques are different. U.S. pilots run up engines to gain thrust, release brakes, accelerate to V_1 then at rotation speed lift off to pass through the 35-ft. elevation at V_2. The Soviet pilots similarly run up and release brakes but when they reach 180 kilometers per hr. (97 knots) they haul back on the controls. (It takes two!)

The airplane continues accelerating down the runway and lifts off at about 280 or 290 kph (150 knots). They let it accelerate to 320 kph, then clean it up. Cruise is at Mach 79.

In time checking for fuel consumption (there were no flow gauges) I estimated cruise consumption of the Tu-104 engines at 12,000 lbs. per hour or 6,000 each.

The aircraft have a mechanical means of raising (they say) and lowering the landing gear. They use no reverse thrust, braking is good, and although all are equipped with a drag chute, it wasn't used in any of our five landings.

Pilots come in on long finals of about 10 miles at 300 kilometers per hour (160 knots) using 30-degree flaps. They come over the fence at 300 kph with both pilots on the wheel and touch down at 280 kph (150 knots) compared to 110-120 knots for U.S. big jets.

Instruments appear the same used by the Soviet military, but there is no integration of instruments. The ADF is separate and is not the radio magnetic indicator (RMI) type but rather the old relative-bearing type.

For engine instrumentation, the Tu-104 has a somewhat crude tachometer, an exhaust gas temperature gauge and another dual gauge that measures two pressures and presumably indicates the pressure ratio of the engine. It indicates high pressure over low pressure, both in kilograms per square centimeter. It reads 50/5 at takeoff, 45/4.8 in climb and 35/3.8 at cruise.

Navigation gear is typical of that used by Pan Am in Latin America 10 to 15 years ago. They have dual old ARN-1 ADF's, use their airborne radar for both weather avoidance and navigation. They generally navigate by a system of low frequency beacons spotted anywhere from 50 to 60 miles apart in the Moscow-Riga or Moscow-Leningrad segments and up to several hundred miles apart on the Moscow-Tashkent route.

Airports use both asphalt and concrete runways. The new Moscow Airport has a 3,500-meter concrete runway of 10 ft. square concrete blocks, is about 200 ft. wide.

Flight dispatch for jets is all IFR. Lowest Russian minimums are 30/300 meters or 100 ft. and ⅛ mile.

For jets, operating minimums are 100 meters ceiling and one kilometer (6/10 mile) forward visibility.

Red pilots are good. They are well-trained and the jet pilots averaged five years in Aeroflot on piston types. Their selection for jets is based on ability, not seniority. In transition, a pilot in the Leningrad territory is given 3 weeks ground school, 40 hrs. flying transition, then flies 40 more on the line as copilot.

He is then cleared to fly, but with ceiling/visibility restrictions of 150 meters/1500 meters. After 40 to 50 hours he is again OK'd by a check pilot. The Moscow territorial school is similar except that it uses 50 hrs. transition flying, 50 on line as copilot and 64 hrs. additional flying before being rated for standard minimums.

Pilot pay is 7,000 rubles, copilot 70% of pilot, navigator 60%, radio operator 50%. Jet pilots fly 50 hrs. a month, get 1½ hrs. credit for each hour of night flying. The union can approve 10 hrs. extra on jets, but this is without pay and is repaid in compensatory time off. Vacation for all, pilots through stewardesses, is 45 days a year.

Aeroflot uses no dispatchers. Air traffic control assumes some of the responsibility. A ground control officer helps navigators prepare flight plans and signs them. He has authority to prevent dispatch of the flight, but cannot order the pilot to fly the schedule. The pilot, however, has authority to order additional fuel and to kick off payload.

It is apparent that, with only a fair airplane and trailing U.S. standards both in facilities and performance, Aeroflot makes up for it with a high degree of effectiveness by picking its best pilots for jet crews. ■

ARTIST'S SKETCH of local transport based on design philosophy of TTA president Earl McKaughan.

Blueprint for a DC-3 Successor

Despite a bevy of entries for the title of 'DC-3 replacement,' many local airlines are still waiting for the 'ideal' transport. Here's how Earl McKaughan, president of Trans Texas Airways, would design it

THE TRANSITION TO TURBINES has produced a new stable of transports from big jets to turbine helicopters, but it has yet to find a universal replacement for the 25-year-old DC-3.

Ideas about what constitutes the "ideal" successor to this venerable workhorse vary widely. Trans Texas Airways' president Earl McKaughan, who recently ordered 22 Convair 240s to tide his airline over until the "real thing" comes along, would replace them with an aircraft built along these lines:

Configuration: Physically, McKaughan's design would resemble an elongated CV-440 (see sketch). It could be either high or low wing. Power should be provided by no more than two high efficiency turbines. Height from ground should be held to a minimum, for easy passenger and cargo loading.

The wings should incorporate the most efficient high lift features available. Fuel capacity should permit terminal-to-terminal roundtrips without refueling. The airplane should be able to fly a 500-mile segment, with or without intermediate stops, and return without taking on additional fuel.

Operating characteristics: With a high-lift wing, the aircraft should be able to operate from very short runways. It should be capable of fast but comfortable climbs and descents. Ideally, it should operate on 100-mile hops at a 50 percent breakeven load factor. The normal efficient cruise speed should be at least 300 miles per hour, but a "fast cruise" should be possible for making up lost time.

Features: Seating capacity should range from 45 to 55 passengers in full-width firstclass configuration. Alternatively, the aircraft should accommodate 60-70 commuter seats or 40 passengers with a large cargo capacity.

Passenger loading should be via integral steps with provisions for carry-on baggage and baggage claim at the passenger door. The airplane should be fully air conditioned with fast recovery pressurization.

Cargo loading should be at waist level and unitized. Ground support equipment, such as conveyors, should not be required.

The cabin should include a buffet and an enroute ticketing unit. The rest room should have electric waste disposal features to reduce ground servicing, and the aircraft should have a self-contained power unit.

The design should provide for unitized plumbing and electrical systems which could be inspected and serviced from the outside of the aircraft.

Simplicity should be the keynote for all controls and systems. The aircraft should have provision for radar transponders and for other new communications and navigational systems now under contemplation.

This, in a nutshell, is McKaughan's "ideal" local transport. It probably comes as close to the median for all local airlines as possible. No such airplane, with precisely these features, exists today.

The combination of Fairchild F-27 and Fokker Friendship admittedly has made strong headway. Turbine conversions of Convair 340s and 440s also are making their mark. Across the Atlantic, new models such as the de Havilland Caribou, Handley Page Dart Herald, Avro 771 and others are vying for the market. But none of these, as yet, are a true "DC-3 replacement."

In the U.S., where local operations are expanding faster than in any other part of the globe, only five of the 13 carriers have bought new aircraft. Seven others (including Trans Texas) have chosen Convair 240/340/440 or twin-engined Martins as "hand me down" interim transports. Allegheny and Lake Central are going one step further with turbine conversions of the Convairs.

Only one airline—Central—has made no decision. And McKaughan's choice of former AA 240s as supplements for his DC-3s was made *after* he had "designed" for us this "ideal" transport. His purchase of 240s thus serves only to emphasize the question: Will such an airplane as outlined here ever really be built? ■

THE 'IDEAL' LOCAL TRANSPORT

Fuselage—somewhat like an elongated 440
Wing—high or low with the most efficient high lift devices
Engines—not more than two high efficiency turbines
Range—500-mile segment roundtrip without refueling
Economics—must operate on 100-mile segments at 50% breakeven load factor
Cruise Speed—minimum of 300 mph
Seating Capacity—45-55 passengers first class, 60-70 commuter, or 40 commuters plus cargo

Helicopter Outlook:

A Long Pull But a Solid Future

New turbines will build the business, but it may take a second-generation model to fully satisfy shorthaul needs

By ERIC BRAMLEY

THERE IS A GAPING HOLE in the U.S. transportation system.

It is in the short haul, city-center-to-city-center market. Over any distance up to 300 miles, today's airline passenger spends an average of three hours traveling between city centers, and more than half of this is ground time.

This gap will be filled by a big compound helicopter, possibly within seven years. The next generation of commercial helicopter, twin-turbine and carrying about 25 passengers, will not do this center-to-center job.

The twin-turbine will represent a tremendous advance in rotary-wing economics. But it will not be the cure-all. It will enable the three scheduled U.S. helicopter operators to substantially reduce or eliminate subsidy over the next several years. It will permit subsidy-free airport-to-downtown or airport-to-airport service at other cities when the available traffic is substantially greater than it is today.

This helicopter is likely to find wide acceptance in the industrial field—powerline construction, off-shore oil, logging, etc. These uses plus the scheduled services will produce a fair commercial market. The compound helicopter may tap big sources of new traffic; it is a possibility for local service operation. Thus, its market is an unknown quantity.

Neither the twin-turbine nor the compound will bring lower fares. Short-haul transportation is costly.

Convertiplanes will not be feasible commercially for 15-20 years.

These are the opinions and conclusions expressed by manufacturers of large transport helicopters in interviews with *AIRLIFT*.

In this field are Sikorsky Aircraft with its S-61, carrying up to 28 passengers and selling for $650,000, and Vertol division of Boeing with the 107, a 25-place model quoted at $507,280 plus engines, or about $647,280. These twin-turbine craft will be powered by the General Electric CT58-110, which weighs 295 lbs. and delivers up to 1250 shp. Chicago Helicopter Airways plans to operate six S-61s and Los Angeles Airways five. New York Airways will fly 10 Vertol 107s.

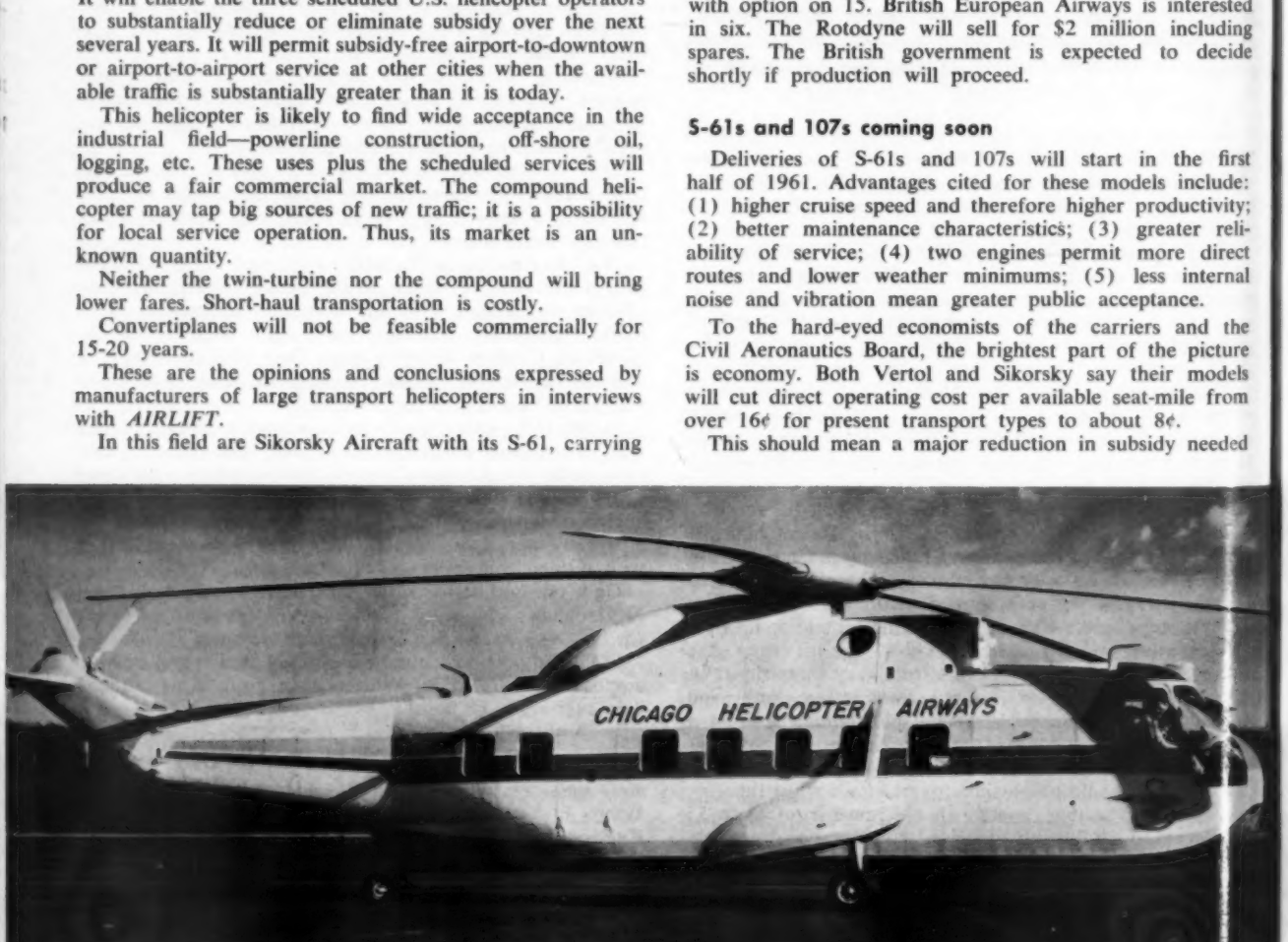
Looking to the 1964-65 period is Kaman Aircraft, which is licensed to build the British Rotodyne, a 54 to 65-seat 200 mph craft, using a jet-driven rotor for vertical lift, then partially unloading the rotor by use of wings, and employing two Rolls-Royce Tyne engines for forward speed. New York Airways has an agreement to buy five, with option on 15. British European Airways is interested in six. The Rotodyne will sell for $2 million including spares. The British government is expected to decide shortly if production will proceed.

S-61s and 107s coming soon

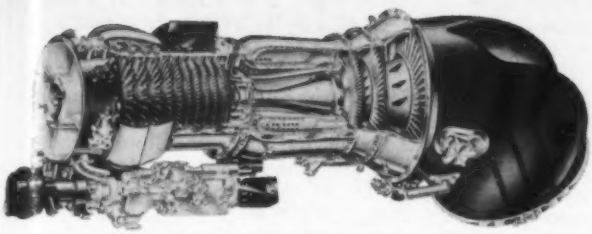
Deliveries of S-61s and 107s will start in the first half of 1961. Advantages cited for these models include: (1) higher cruise speed and therefore higher productivity; (2) better maintenance characteristics; (3) greater reliability of service; (4) two engines permit more direct routes and lower weather minimums; (5) less internal noise and vibration mean greater public acceptance.

To the hard-eyed economists of the carriers and the Civil Aeronautics Board, the brightest part of the picture is economy. Both Vertol and Sikorsky say their models will cut direct operating cost per available seat-mile from over 16¢ for present transport types to about 8¢.

This should mean a major reduction in subsidy needed



SIKORSKY'S ANSWER is big S-61 now on order by both Chicago Helicopter Airways and Los Angeles Airways for use next year.



GENERAL ELECTRIC'S CT58 turbine powers both the Sikorsky and Vertol entries.

by the three certificated lines. For example, Sikorsky believes that CHA, the biggest passenger carrier, can be subsidy-free with S-61s in a very few years if its traffic continues to build as expected. LAA and NYA, currently with fewer passengers, will show substantial gains.

The three carriers have been making rapid progress in increasing commercial revenues, thus holding down subsidy and furnishing more service with no boost in government aid. Their total subsidy in fiscal 1961 will be about $4.8 million, the same as 1960. The fact that they soon will have a chance to reduce this figure will be welcome news to CAB and to certain legislators who repeatedly question the value of the sudsidy.

Some Congressmen have been outspokenly critical of the helicopter experiment. This year, Rep. H. R. Gross (R.-Iowa) tried to eliminate all helicopter subsidy, stating he could see no reason why Congress should continue to support commercial service. Rep. Albert Thomas (D.-Tex.), powerful chairman of the appropriations subcommittee which handles CAB money, said he was inclined to agree with Gross, promised to do his best to look at the appropriation next year.

Thomas asked: "Will my friend from Iowa withdraw his amendment, and then we will see if we cannot get rid of this next year." Gross withdrew.

However, present helicopter subsidy payments are not in immediate jeopardy. Government policy is that there shall be a limited helicopter experiment, CAB determines on a year-to-year basis how much support is needed, and Congress is obligated to pay. Legislators could, of course, try to amend the Federal Aviation Act to establish a date beyond which subsidy would not be paid.

The carriers are highly optimistic about future traffic. With introduction of Vertol 107s next year, NYA expects to haul upwards of 500,000 passengers a year, an increase of almost 400%. By 1963, when all 10 Vertols are delivered, it will have capacity to handle more than 1 million a year. Two years later it expects 3 million will be using helicopter services within a 75-mile radius of New York.

CHA's traffic has boomed from 55,314 passengers in 1957 to 108,911 in 1958 and 204,393 in 1959. This year's forecast is 330,000 and in 1962 it expects to top a million.

LAA says it will push its passenger count to 250,000 in 1961, 500,000 to 730,000 in 1962, and 730,000 to one million in 1963.

Any expansion of subsidized metropolitan-type service is against CAB policy. The agency told Congress this year: "Until such time as a more economical helicopter can be produced, it is the stated policy of the Board to maintain the . . . experiment in approximately its present framework . . . There is no current intention to certificate additional helicopter services. The state of the art has been improving and large type helicopters with an increased economical potential are being considered by the existing . . . operators."

Eight applicants for Washington

Some feel that CAB may relax this policy to the extent of at least holding a hearing on applications in the Washington-Baltimore area, particularly with the opening of Dulles International Airport scheduled for 1961. Eight applicants want to fly in this area.

But there is little chance that anything will be done with the 72 other applications on file—some dating back to 1946. All but six seek routes in or around the nation's 26 largest metropolitan areas. A handful of petitioners ask certification on a non-subsidy basis, but they, like the others, look to transport of mail as a major source of income. At least 50% of the applicants now operate helicopter services, most of them on a contract basis. Four are local service lines—Mohawk, Central, North Central and West Coast.

Could a prospective operator start a metropolitan service, subsidy-free, in any cities other than Chicago, New York and Los Angeles with either of the new twin-turbines? The answer is no. Sikorsky states that an S-61 airline which develops the traffic potential inherent in one of the largest 10 U.S. air traffic generating hubs should operate subsidy-free in about seven years.

A sales engineer puts it this way: Assuming direct operating cost of $225 per hr., 1,800 hrs. utilization an-

ONE VIEW OF ULTIMATE shorthaul machine is a compound helicopter, but it may be five to seven years away.

VERTOL 107 to be introduced by New York Airways is expected to boost passengers to million mark by '63.

nually, plus indirect cost at 80% of direct, operating expenses per helicopter per year would be $730,000, or $1,460,000 for a minimum fleet of two. At a $6.50 fare, this means 225,000 passengers (CHA last year carried 204,393).

Very optimistically, the operator might carry 3% of the enplaned fixed-wing passengers. If he did, the city would have to have 7.5 million enplaned passengers a year. The New York airports last year totaled 5.9 million.

There's some opinion that service in a few sections, where traffic would not be dependent on fixed-wing passengers, might have a chance of success. One example is Victoria-Vancouver, where there is a water barrier. It is pointed out that where an operator depends primarily on fixed-wing traffic, he must run a "junior airline" with reservations, through ticketing, etc., thus increasing indirect costs. But where the carrier is depending more on the "briefcase trade," a streamlined set-up might reduce these costs to as low as $3 per passenger.

In any such operation, fares will be higher than fixed-wing, but the latter aren't realistic, one observer states, adding: "The average person thinks of airline fare as about 6¢ a mile, but there's no such magic number in short-haul. Airline losses on short routes are written off over the long hauls. This 6¢ is a mental block to people interested in operating helicopters. It would be a major accomplishment if we could get them to forget it. You can't kid yourself that turbines will bring a 6¢ fare. Higher tariffs will be sold on time saved by the helicopter and convenience to the passenger."

Market forecasts vary

This all adds up to the fact that use of the twin-turbine in scheduled commercial operations will be limited. Estimates vary widely on the size of the fleet. One prediction is that within two or three years there will be about 75 in operation, compared with 26 today (the three U.S. lines plus Sabena). This would include a few operators that might decide to make a go of it without subsidy. It would also include British European Airways, which plans to start service next summer between London and Paris, Brussels, Amsterdam, Manchester and/or Birmingham, using S-61s or 107s.

Another prediction was that the helicopter total will probably be closer to 25 or 30 because the new craft have a much greater carrying capacity. In addition, there will be industrial sales, at least double airline sales.

After the twin turbines have helped build traffic, Kaman Aircraft believes that the Rotodyne will take over four or five years from now. A development of Fairey Aviation (now under Westland since the reshuffle of the British aircraft industry), with which Kaman has a cross licensing agreement, the Rotodyne awaits a government go-ahead signal. Kaman is confident it will be produced.

The Rotodyne, it is claimed, can be operated over stage lengths from 10 to 300 miles. For example, on a metropolitan service, direct and indirect costs are figured at 11.5¢ per available seat-mile with a 20-mile block distance. With present fare yield of 30.7¢ a mile, a carrier would need only a 37% load factor to break even. This includes no mail-cargo revenue.

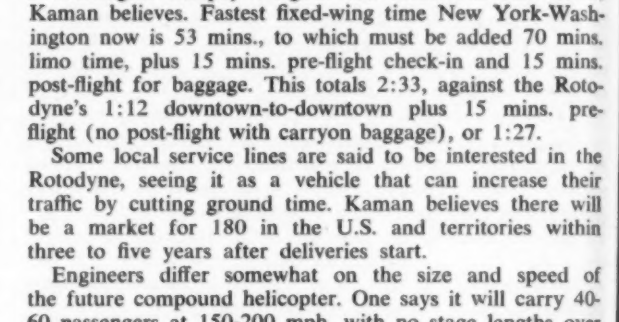
On a New York-Washington route, the Rotodyne, with 2,400 hrs. a year utilization and 60 seats, would have total seat-mile cost of 5.65¢. If the fare were equal to the present first-class charge of $17.40 plus limousine at each end, or $19.95, breakeven load factor would be 59.5%. To reduce the breakeven somewhat, fare probably would be nearer $25.

Passengers will pay a higher fare because of time saved, Kaman believes. Fastest fixed-wing time New York-Washington now is 53 mins., to which must be added 70 mins. limo time, plus 15 mins. pre-flight check-in and 15 mins. post-flight for baggage. This totals 2:33, against the Rotodyne's 1:12 downtown-to-downtown plus 15 mins. pre-flight (no post-flight with carryon baggage), or 1:27.

Some local service lines are said to be interested in the Rotodyne, seeing it as a vehicle that can increase their traffic by cutting ground time. Kaman believes there will be a market for 180 in the U.S. and territories within three to five years after deliveries start.

Engineers differ somewhat on the size and speed of the future compound helicopter. One says it will carry 40-60 passengers at 150-200 mph, with no stage lengths over 200 miles. Another predicts 40-50 passengers, 225 mph cruise, 275-mile range.

Direct operating cost per available seat-mile of the compound will be in the 4¢ range—against 8¢ for the twin-turbine and 16¢ for present piston models. Figuring a 50% load factor, New York-Washington fare will be 14¢ a mile or about $28. Cost of the aircraft is estimated at $1,225,000 to $1,500,000. Time of its commercial availability depends on when military orders are placed.



BRITAIN'S ROTODYNE, four to five years away, now awaits British government support in its bid for future markets.

General Electric already has under development for the Navy a more powerful helicopter engine, the T64, that could power a compound. It develops 2650 shp against the T58-110's 1250 shp. The S-61 and 107, incidentally, first will have the 1050-shp T58-100 which later will be modified to the T58-110. GE believes the latter engine can reasonably be expected to reach 1500 to 2000 hrs. between overhauls, against 600-700 hrs. for present R1820 piston engines.

What about aircraft using various tilt devices for VTOL and high forward speed? No one doubts that they eventually will be commercially feasible, but not for 15-20 years, well after they enter military service. "They will be economic monsters for at least 15 years," comments one engineer. ■

How Operators See 'Copter's Future

Lower operating costs, greater demand and more help from airlines are factors

By DANNA KUSIANOVICH

THE DAY when a "Three-S" passenger helicopter service —scheduled, subsidy-free, and successful—can be inaugurated in the United States is five to ten years away.

The day, in fact, may never arrive unless there is: (1) a 50 percent reduction in present seat-mile operating costs; (2) a great increase in public demand for and acceptance of helicopter transportation; and (3) a similar increase in airline cooperation.

Even a 50 percent reduction in operating cost will not permit profitable operation of scheduled passenger service with anything smaller than a 20-place, turbine-powered helicopter.

The same set of facts would apply to a new, subsidized, service in a city such as Washington or San Francisco. The service could expect to require subsidy for seven to ten years.

These, with minor variations, are the conclusions of a representative group of operators interviewed by *AIRLIFT*.

The operators, all of whom have applications for route certification pending before CAB, spoke from first-hand experience. With one exception, all have attempted to operate scheduled airport-downtown services in their areas. And, again with one exception, all have abandoned the attempt and have gone back to the proven fields of contract and specialized operations.

Typical of the group is J. C. Weadock, executive vice president of Chesapeake and Potomac Airways of Baltimore.

"Strictly as an experiment" for five months in 1958, Weadock's firm ran a schedule of two round trips a day with Bell 47-H equipment between Baltimore, Friendship Airport, Washington and Andrews AFB. Fare was $9 one way. Despite widespread expressions of interest in the service, load factor averaged 30 percent.

50% breakeven, $10 fare

Based on his experience, Weadock believes that non-subsidy operation hinges on development of large equipment with an operating cost low enough that the service can break even with a load factor of 50 per cent or less and a fare of less than $10. He sees "no future at all" for scheduled air taxi operations with small equipment.

Weadock goes further and says that only a "certificated air carrier" will ever be successful, because the traveling public is not inclined to accept an air taxi type of service.

Chesapeake and Potomac is one of eight firms seeking certification to serve Washington's Dulles International Airport. The Baltimore-Washington-Dulles route is the one rated "most likely" to be approved by CAB for the nation's fourth passenger helicopter operation, if and when the Board relaxes its present "no new certification" policy.

Weadock envisions serving the route with S-61 equipment, and figures that he might be able to be off subsidy "within ten years, depending on airline traffic at Dulles."

Another applicant for the Dulles route is Pilgrim Helicopters of Washington, a firm which also once took a brief flirt at Washington-Friendship schedule, using Bell 47-Hs.

Donald D. Webster, Pilgrim president, recently announced plans to start a new Washington-Friendship shuttle, this time with an S-62. However, some view the move primarily as an attempt to strengthen Pilgrim's position in the Dulles certification competition.

FIRST TURBINE to enter service will be Los Angeles Airways' S-62. LAA president Clarence Belinn (right) accepts aircraft from Leete P. Doty, asst. gen. mgr., Sikorsky.

AMONG NEWER helicopter operators using Bell 47Js is W. L. Davis, above, president of Atlanta Helicopter Airways.

Webster told *AIRLIFT* he thinks it will be "a long time" before public acceptance of helicopter service will grow enough to generate sufficient load factors for subsidy-free operation. He cited through ticketing, airline cooperation, and a "less than $10" fare as essentials for success.

A variation on the subsidy theme was played by Gordon Hall, general manager of Helix Air Taxi in Dallas. Helix has an application pending with CAB for routes in the Dallas-Ft. Worth area, to operate without subsidy.

"Our present thinking is that if we cannot operate without being a burden to the taxpayers, we will not operate," Hall said. "But," he went on, "in order to transport passengers profitably, it will be necessary to have much larger equipment with much lower seat-mile costs."

Helix has also had a go at scheduled air taxi, but abandoned it because of cost. The firm now operates a Bell 47-G on a charter basis.

"Definitely no" was the reply of W. L. Davis, president of Atlanta Helicopter Airways, to the question of whether his area would support a subsidy-free scheduled service with large helicopters.

Atlanta Helicopters initiated a schedule of 11 roundtrip flights per day last February 3, using Bell 47-Js. Fares range

from $5 to $15. Davis said passenger growth has been "well below expectations," but did not indicate whether he expects to continue the service.

Only one of the operators contacted by *AIRLIFT* indicated that a non-subsidized service might be possible in his area. This was William J. Scripps, president of Helicopter Airways Service of Detroit.

Scripps, who operates only on a charter basis, said he believes a scheduled air service could succeed on a Cleveland-Detroit route, but only "if the 12,500 lb. maximum can be eliminated on air taxi operators."

Larger equipment, lower operating costs, higher load factors—these seem to be the keys to the future of "Three-S" helicopter service. Right now, these keys are being cast.

Helicopter Markets and Operations

Metropolitan Area Ranking 1960 Census	Metropolitan Area Population 1960	City Ranking 1960	Airport Ranking by Total Operations 1959	Airport Ranking by Air Carrier Operations 1959	No. of Scheduled Airlines Serving	Enplaned Airline Passengers 1959	No. of Passenger Helicopter Services*	No. of Helicopter Service Applications Pending with CAB
New York	10,545,300	1	La Guardia—8 Idlewild—15 Teterboro—21	Idlewild—4 LaGuardia—5	LaGuardia—7 Idlewild—39	LaGuardia—2,485,431 Idlewild—1,952,114	4	3
Los Angeles	6,690,069	3	4	3	18	2,671,126	29	1
Chicago	6,150,532	2	Midway—1 O'Hare—17	Midway—1 O'Hare—21	Midway—17 O'Hare—14	Midway—3,799,504 O'Hare—735,543	5	1
Philadelphia	4,289,194	4	not in 25 ranked	18	11	894,916	5	1
Detroit	3,761,220	5	not in 25 ranked	16	Muni—6 Willow Run—8	1,290,738	1	5
San Francisco-Oakland	2,721,045	12 & 23	16	10	14	1,853,445	3	8
Boston	2,561,450	13	not in 25 ranked	12	14	1,342,510	2	4
Pittsburgh	2,394,632	16	not in 25 ranked	13	9	978,286	1	4
St. Louis	2,040,188	10	18	14	9	874,989	3	7
Washington	1,968,562	9	5	2	15	2,225,257	1	8
Cleveland	1,780,263	8	23	11	10	1,000,344	0	2
Baltimore	1,706,076	7	not ranked	not ranked	10	266,339	1	8
Newark	1,675,817	30	not ranked	8	11	1,467,222	**	**
Dallas-Ft. Worth	1,642,145	14 & 45	12 (Love)	9	7	1,351,779	2	6
Minneapolis-St. Paul	1,477,080	25 & 40	13	17	7	746,590	2	2
Buffalo	1,304,581	20	not ranked	not ranked	5	502,631	1	0
Houston	1,234,868	6	not ranked	not ranked	10	616,481	1	4
Milwaukee	1,186,875	11	not ranked	not ranked	3	366,938	1	2
Patterson-Passaic	1,180,186	not ranked	not ranked	not ranked	See NYC	.....	1	0
Seattle	1,096,778	18	not ranked	not ranked	10	664,222	2	2
Cincinnati	1,059,026	23	not ranked	23	5	541,284	1	2
Kansas City	1,027,562	27	not ranked	19	8	699,146	1	2
Atlanta	1,014,349	24	22	7	8	1,082,048	1	3
San Diego	1,003,572	19	not ranked	not ranked	4	307,560	3	2
Denver	923,161	22	7	15	8	789,319	1	3
Miami	917,851	44	2	6	23	1,570,022	5	5

Passenger Helicopter Services

New York: New York Airways (scheduled)
Consolidated Helicopter Co.
Eastern Helicopters Inc.
Execuplane

Los Angeles: Los Angeles Airways (scheduled)
A.F. Helicopters Inc.
Agricultural Helicopters Inc.
Aircopter Transport Inc.
Ameco Helicopters Inc.
Atlas Helicopters Inc.
Briles Manufacturing Inc.
California Ambulance Service
California Copters
Charter Air Lines
Cisco Helicopters
Comet Copters
Duschak's Helicopter Rotor Service Inc.
ERA Helicopters Inc.
General American Helicopters, Inc.
Haskell Flying Service
Helicopter Corp. of America
Helicopter Service
Helicopters Unlimited
Heli-Crane Corp.
Mercury Helicopter Service
Helicabs Inc.
Rotor-Aids
Southwest Helicopters Inc.
Stansbury Inc.
Stewart Air Service
Utility Helicopters Inc.
Williams Helicopter Service
Stan Winchester

Chicago: Chicago Helicopter Airways (scheduled)
Helicopter Air Lift
Howell Flying Service
Joliet Airmotive Inc.
Snyder Helicopter Service Inc.

Philadelphia: Aero Service Corp.
Carsons Helicopter Service
Delaware Valley Helicopters
Keystone Helicopter Corp.
Valley Forge Helicopter Airways Inc.
Helair, Inc.

Detroit: Helicopter Airways Service Inc.

San Francisco: Bay Aviation Services Inc.
Rep-Air Inc.
Rick Helicopters Inc.

Boston: East Coast Aviation Corp.
E. W. Wiggins Airways Inc.

Pittsburgh: Miller Aviation Center

St. Louis: Hempel Helicopters Inc.
Mississippi Valley Helicopters Inc.
Remmert-Werner Inc.

Washington, D. C.: Pilgrim Helicopter Services, Inc.

Airport Served by New York Airways

Cleveland—None
Baltimore: Chesapeake and Potomac Airways Inc.
Newark—None
Dallas-Ft. Worth: Continental Copters Inc.
Helix Air Transport
Minneapolis-St. Paul: Helicopter Services Inc.
Heliflights Inc.
Buffalo: Helicopter Service of Buffalo
Houston: Helicopter Services Inc.
Milwaukee: Midwest Helicopter Service Inc.
Patterson-Passaic: Aeroflex Inc.
Seattle: Aero-Copters Inc.
Sea-Tac Airways Inc.
Cincinnati: Ohio Valley Airways Inc.
Kansas City: Belger Helicopter Service Inc.
Atlanta: Atlanta Helicopter Airways Inc.
San Diego: Coast Rotors Inc.
Eddy-Molitor Helicopters
La Mesa Helicopter Service Inc.
Denver: Helicopters Inc.
Miami: Aeroists International Inc.
Arvida Air Service
Dupont Air Interest Inc.
Sun-Line Helicopters Inc.
Trans-Helicopter Inc.

Transport Helicopter Specifications

LARGE HELICOPTERS	Number of Seats	Powerplant			Dimensions					Rotor System			Performance (at gross)							
		Number of Engines	Make and Model	Rated Horsepower	Overall Length	Overall Height	Empty Weight	Gross Weight	Fuel Capacity (gal.)	Rotor Diameter	Number of Rotors	Number of Blades	Maximum Speed (mph)	Cruise Speed (mph)	Hover Ceiling In Ground Effect	Service Ceiling	Rate of Climb (fpm)	Range (miles)	Basic Price (with engines)	Availability
Rotodyne (Kaman Aircraft Corp.)	54-65	4 2	Fairey tip jets Rolls Royce Tyne	5250	104'	23' 2"	35,564	60,000	1,250	104'	1	4	201	201	10,000+	N.A.	2,000'	716	$1,700,000	1964 (?)
Sikorsky S-61	28	2	GT-58-110	1250 shp ea.	72' 5"	16' 8"	10,422	17,704	390	62'	1	4	150	145	9,500'	NA	NA	265	600,000	1961
Sikorsky S-58	20	1	Wright R-1820-84	1275	65' 10"	15' 11"	7,630	13,000	182	56'	1	4	101	101	4,900'	9,600'	1,100	190	267,000	Present
Boeing Vertol 107	25	2	GT-58-110	1250 ea.	83' 4"	16' 10"	10,425	18,450	350	50' ea	2	3 ea.	162	158	7,800'	13,700'	1,700	265	647,280	1961
Boeing Vertol 44	20	1	Wright 1820-103	1275	86' 4"	15' 5"	8,990	14,350	280	44'	2	3 ea.	127	101	5,400'	NA	1,050	280	298,500	Present
Sud Aviation Frelon	20-24	3	Turmo III-C	1000 shp ea.	48' 10"	15' 5"	9,920	17,640	NA	49' 2"	1	4	NA	NA	NA	NA	NA	NA	NA	NA
MEDIUM																				
Sikorsky S-62	10-12	1	GE T-58-6	1050 shp*	62' 3"	8' 9"	4,600	7,500	182	53'	1	3	124	115	15,700'	15,700'	1,380	270	276,458	Present
Sikorsky S-55	12	1	P&W R-1340	600	62' 3"	15' 3"	4,980	7,200	185	53'	1	3	101	85	6,400'	[illegible]	700	405	170,000	Present
Bell 204B	10	1	Lycoming T-53	700 shp	53'	14' 6"	4,318	8,500	125	44'	1	2	141	121	8,500'	NA	1,500	219	285,000	Present*
SMALL																				
Alouette III	7	1	Artouste III	870**	33'	9' 8"	2,300	4,630	158	36'	1	3	124	115	6,560'	13,100'	NA	317	140,000-150,000	2nd half 1961
Alouette II (Republic Aviation)	5	1	Artouste II	400 shp	31' 6"	9'	1,875	3,527	152	33' 6"	1	3	108	106	6,560'	10,500'	880	330	102,300	Present
Bell J-2	4	1	Lycoming VO-540	305 derated to 240	43'	9' 3"	1,730	2,850	48	37'	1	2	105	81	9,200'	12,100'	800	260	72,500	Present
Bell 47G3	3	1	Franklin 6VS-335A (s.c.)	225	43' 2"	9' 3"	1,609	2,650	42	37' 1"	1	2	105	79	15,400'	19,600'	755	200	44,500	Present
Bell 47G2	3	1	Lycoming VO-435	250 derated to 200	41' 4"	9' 4"	1,564	2,450	43	35' 1"	1	2	100	85	10,850'	12,300'	805	238	40,500	Present
Hiller 12E4	4	1	Lycoming VO-540	305	29' 11"	9' 10"	1,775	2,750	46	35' 5"	1	2	96	90	10,000'	14,600'	820	225	69,960	Present
Cessna CHIC	4	1	Cont. FSO-526A (s.c.)	270	42' 6"	9' 5"	2,080	3,100	60	35'	1	2	122	90 to 120	9,600'	+-30,000	1,080	260	79,960	1961
Hughes 269A	2	1	Lycoming O-360-C2B	180	22' 3"	7' 11"	867	1,550	25	25'	1	3	90	85	6,000'	10,000	1,450	200	72,500	Present
Brantley B-2	2	1	Lycoming VO-360	180	21' 9"	7'	980	1,600	31	23' 9"	1	2	100	NA	4,700'	NA	NA	300	19,950	Present

*Derated to 730 hp
**Derated to 500 hp
† Commercial certification dependent on customer response.

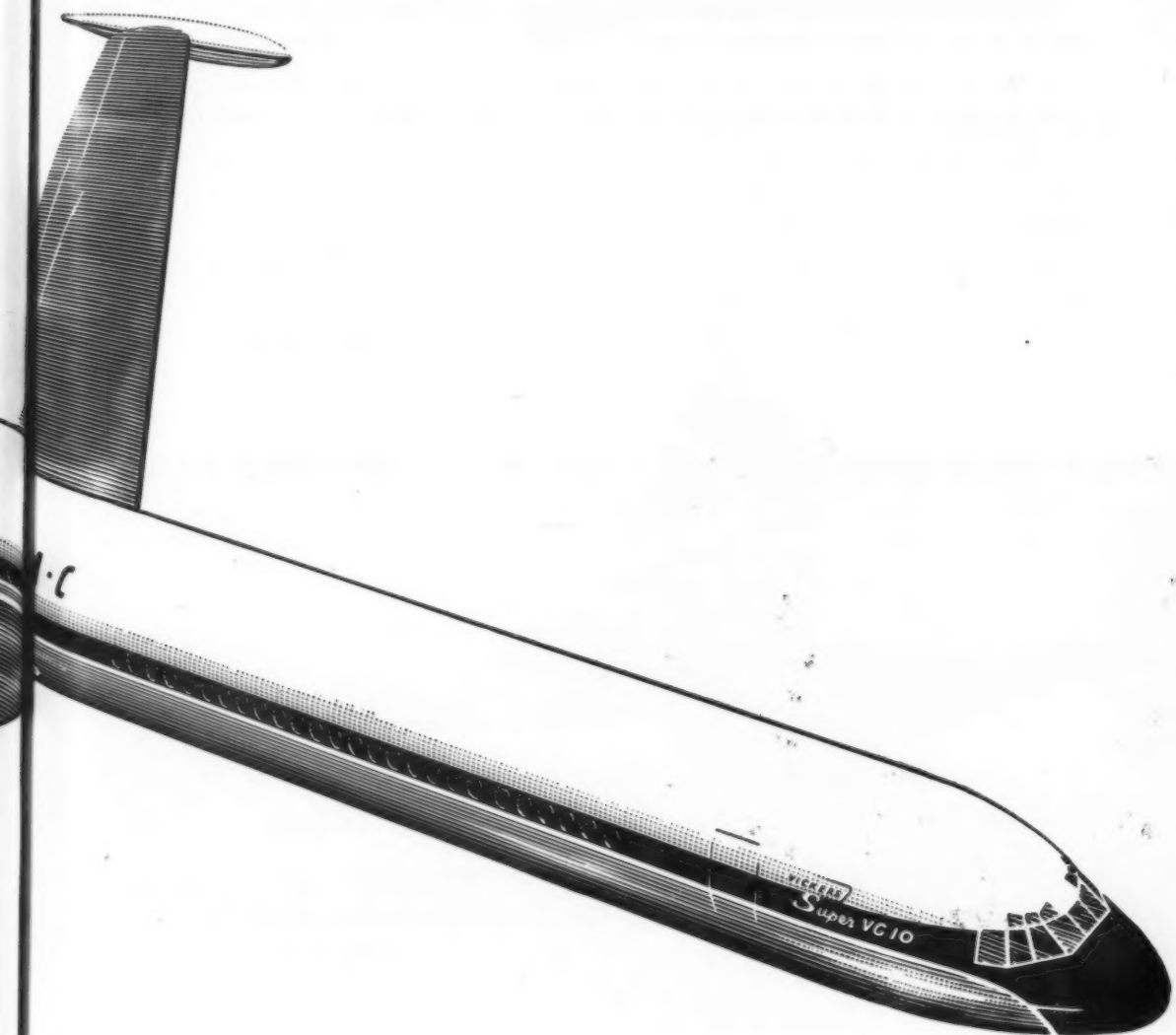
BOAC ORDERS 10 VICKERS SUPER VC 10's

BOAC has followed its contract for 35 Vickers VC 10 jetliners by ordering from British Aircraft Corporation ten Super VC 10's—aircraft which are tailor made for high density routes such as the North Atlantic.

In an economy class layout the Super VC 10 can carry up to 212 passengers plus 4 tons of freight non-stop from London to New York against strong headwinds.

Both Vickers VC 10 and Super VC 10 with their new look clean wings and rear-mounted engines will offer an air field performance and a cabin comfort which will make them the most passenger preferred long haul jets in operation.

FROM BRITISH AIRCRAFT CORPORATION!



VICKERS
Super VC10

POWERED BY FOUR REAR-MOUNTED ROLLS-ROYCE CONWAY BY-PASS ENGINES
MEMBER COMPANY OF BRITISH AIRCRAFT CORPORATION

Aloha Airlines Selects

wilcox CANARI "Nav-Com" Equipment

Only the latest and most dependable equipment is selected by Aloha Airlines to handle its ever increasing passenger volume . . . currently 100% greater than 1959.

F-27's provide the fastest flights in inter-island service. Wilcox CANARI equipment provides precision navigation and communications performance on these flights.

Aloha Airlines has achieved a perfect safety record of never a passenger or crew fatality . . . and they will be aided in maintaining it with their dependable Wilcox CANARI equipment.

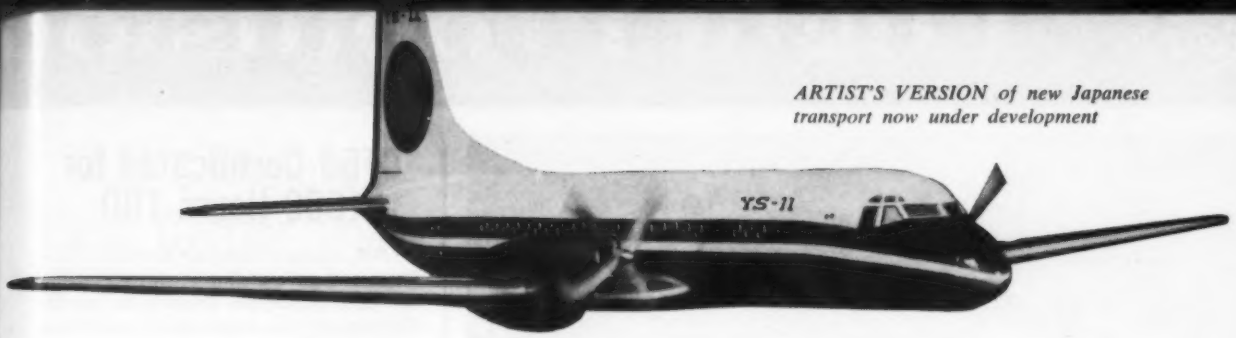
For detailed information about the advantages of Wilcox CANARI equipment in your aircraft . . . commercial or private . . . write, wire or phone:

wilcox
ELECTRIC COMPANY, INC.
Fourteenth & Chestnut Sts.
Kansas City 27, Mo., U. S. A.

ALOHA AIRLINES' WILCOX CANARI "NAV-COM" INSTALLATION

provides . . .

- **Highest accuracy**
- **Proven reliability**
- **Maximum compactness**
- **Light weight**
- **Simplified maintenance**



ARTIST'S VERSION of new Japanese transport now under development

Plans Jell for Japanese Transport

By KAZUO TAKITA
Tokyo Correspondent

Plans for the production of 150 YS-11 turboprop transports by the Nihon Airplane Manufacturing Co. are being finalized by the Japanese cooperative with mass production of the "medium-sized" aircraft scheduled to begin in 1963.

The YS-11 (see photos) is kin to no other aircraft in existence. In appearance it resembles a cross between a Convair 440 and a two-engined Viscount. Except for the engines (Rolls-Royce Darts) it will be entirely "made in Japan."

According to the final full-scale mockup, completed at the Sugita plant of the Japan Aircraft Mfg. Co. in Yokohama, the YS-11 will carry 52 to 60 passengers. The first medium-sized transport to come off the Japanese drawing boards since the end of the war, the low-wing monoplane is scheduled to go into operation on Japanese domestic routes by the latter half of 1963.

The first prototype will be completed by the end of next year, and the second early in 1962. Flight testing will be carried out during 1963. Two additional airframes will be built and used for static loading and fatigue tests.

Full-scale production will begin in FY 1963. The 150th airplane is expected to roll out by the end of 1970. The production schedule calls for nine planes in '63, 15 in '64, 18 in '65, 69 in '66 and 24 planes a year from then on, winding up with 21 in 1970.

The YS-11 will be 86 ft., 3 in. long. Maximum fuselage width will be 9 ft. 5 in. It will stand 30 ft. high. Wing area will be 1,020 sq. ft. It will weigh 30,093 lbs. empty and will have a maximum landing weight of 48,047 lbs. with a maximum payload of 12,130 lbs.

Maximum range, with reserves for 200 nautical miles, will be 1,290 n. miles with a payload of 5,390 lbs. Normal range will be 580 nautical miles with 52 passengers.

The Nihon Airplane Manufacturing Co., Ltd. was formed in March, 1959, following amendment of the Japanese Aircraft Industries Promotion Law. Its capital was subscribed by the government and seven manufacturing companies. Its board of directors is composed of representatives of the government and the "big three"—Mitsubishi, Fuji and Kawasaki.

The idea of a medium-sized transport of purely Japanese design was first advanced by the Ministry of International Trade and Industry in 1955. Six major manufacturers (Mitsubishi, Kawasaki, Fuji, the Showa Aircraft Industries Co., the Shin Meiwa Industries Co., and the Japan Aircraft Mfg. Co.) promptly began work on the design.

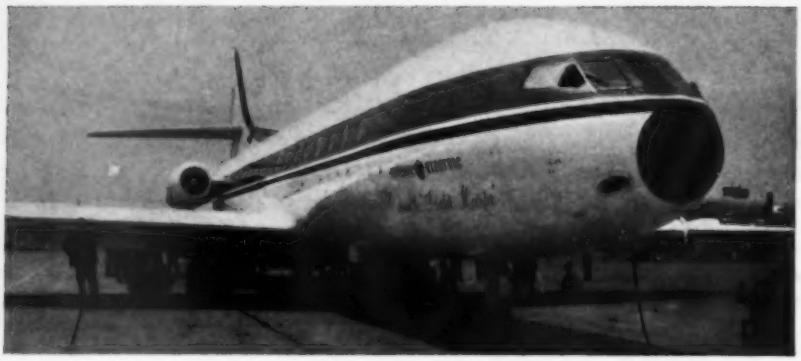
They formed an association—the Transport Aircraft Development Association—in May, 1957, under the direction of Paul Taizo Shoda, former vice president of the Mitsubishi group.

Since the Nihon Airplane Mfg. Co. has no manufacturing facilities of its own, production of the YS-11 will be divided between the separate companies. Kawasaki will provide the wings and Fuji the tail unit. ■

SPECS ON THE YS-11

Span		105 ft. 0 in.
Length, overall		86 ft. 3 in.
Height, over fin		30 ft. 0 in.
Fuselage max. width		9 ft. 5 in.
Main Wing area		1,020 sq. ft.
Wheel base		30 ft. 11 in.
Wing loading		49.4 lb./sq. ft.
Power loading		8.20 lb./e.h.p.
Wt. Empty:	13,650 kg.	30,093 lb.
Takeoff Wt.:	22,800 kg.	50,265 lb.
Max. Landing Wt.:	21,800 kg.	48,047 lb.
Max. Fuel Wt.:	5,540 kg. (7,100 lt.)	12,210 lb.
Max. Payload:	5,500 kg.	12,130 lb.
Cruising Speed:	21,800 kg. at 20,000 ft. 257 kt.	
Takeoff Field Length:	22,800 kg. at I.S.A. 2,890 ft.	
	at I.S.A. + 23°C 3,200 ft.	
Landing Field Length:	21,800 kg. at I.S.A. 3,790 ft.	
	at I.S.A. + 23°C 3,790 ft.	

MOCKUP of Japanese YS-11 is shown underway at Nihon plant in Yokohama. Mockup was completed in August.



General Electric's Caravelle is currently being converted to CJ-805-23 aft-fan engines at Edwards AFB, California. Production aircraft have been designated Caravelle VII.

General Electric Caravelle Begins Conversion to Aft-fan Engines

EDWARDS AFB, Calif.—The General Electric Caravelle recently arrived at the Flight Test Center here to begin conversion to CJ-805-23 aft-fan power preparatory to flight testing. The program calls for retrofitting this fall, with first flights scheduled for December.

The G-E Caravelle arrived after carrying over 3000 passengers during a 16-city sales tour conducted by Douglas Aircraft Company. Douglas will sell and service the Caravelle in the United States and several foreign countries.

The first two CJ-805-23 engines assigned to the Caravelle program are on hand awaiting installation, with the number one engine heavily instrumented. CJ-805-23-powered production aircraft have been designated the Caravelle VII by Sud Aviation.

Each of the CJ-805-23 engines will produce 16,100 pounds static thrust to boost Caravelle speed and range. The new powerplants will also permit reduced sound levels and shorter take-offs and landings.

The aircraft's distinctive short-cowl nacelles are being manufactured by Douglas at Santa Monica, California. Engines will be mounted in the aft-fuselage position. Aft-engine placement and the -23's low inherent noise level will minimize cabin sound in the Caravelle VII.

Based on recently completed flight tests on the CJ-805-23 engine, the Caravelle VII will have extremely low noise levels. Two and a half miles from take-off roll, or at about 1300 feet altitude, the noise level is 106.5 PNdb at full take-off power. During approach at maximum landing weight, the noise level is 108 PNdb at 400 feet altitude.

General Electric's Caravelle short/medium range jet airliner program, announced last December, is designed to make the aft-fan Caravelle VII available to the world market early in 1962. *For further information on the Caravelle VII/CJ-805-23, check GED-4176. See coupon.*

CF700 Completes Two 150-hour Runs

LYNN, Mass.—General Electric's CF-700 aft-turbofan engine recently completed its second unofficial 150-hour endurance run in less than a month.

On both occasions, the powerplant bettered guaranteed thrust and specific fuel consumption. Guaranteed sfc for the 4000-pound-thrust engine is 0.69 lb/hr/lb.

The CF700, destined for the corporate aircraft market, has endurance capabilities which stem from the J85 military turbojet with its more than 17,000 hours experience and the FAA-certified CJ-805-23 aft turbofan commercial engine. The CF700 gas generator is virtually identical to the J85, while the CF700 fan component is a scaled-down version of the CJ-805-23 fan package.

Initial testing of the CF700 began in mid-May. Throughout the test program, acceleration time from idle to full thrust remained below five seconds.

Flight test engines are scheduled for availability in early 1961; FAA-certified engines a year later.

CT58 Certificated for 1000 Hours TBO

LYNN, Mass.—General Electric's CT-58 turbocopter engine recently became the first helicopter powerplant to be certificated for commercial operation with Federal Aviation Agency approval for 1000-hour time between overhaul.

The 1000-hour rating, representing more than a year of normal operation, is the longest TBO granted by the FAA for either reciprocating or turbine helicopter engines. The new rating applies specifically to the Sikorsky S-62, which recently became the first American turbocopter to be certificated for commercial operation.

The T58-6, military counterpart of the CT58, passed its qualification test in August 1958. The T58 recently powered a bailed Navy HSS-1F helicopter more than 1000 flight hours without overhaul, operating about three hours a day for a full year. Parts and components were well within wear limits.

The CT58 and T58 engines power a broad range of modern commercial and military aircraft.

CT58 powers the Sikorsky S-62, first American turbocopter certificated for commercial operation.

Nuclear Flight Propulsion Group Joins FPD

In a move to align operating groups more closely with customer needs, General Electric's Aircraft Nuclear Propulsion Department has been assigned to the Flight Propulsion Division. General Manager is David F. Shaw, who reports directly to John B. Montgomery, newly-appointed division vice-president.

ANPD has been engaged in the development of a military nuclear aircraft propulsion system since 1951. Successful ground tests of reactor and engines have been achieved since 1956 on a direct air cycle system.

A3J Completes First Carrier Trials

EVENDALE, O.—The Navy's North American Aviation A3J Vigilante, powered by two General Electric J79 engines, recently completed the first phase of its carrier suitability trials.

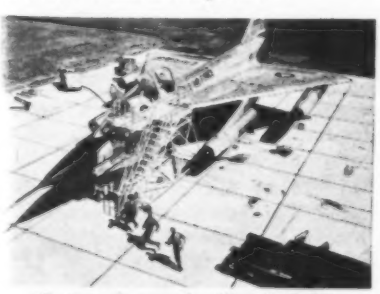
The week-long tests were conducted aboard the USS *Saratoga* off Mayport, Fla. The Vigilante made 15 catapult launches and 14 arrested landings during its first carrier demonstration. Pilots tested the Vigilante's powerplants with several "touch and go" landings, and the plane was given general carrier suitability checkouts, including towing and spotting.

A3J catapults from the USS *Saratoga*, powered by two G-E J79 engines.

The sleek Mach 2 bomber's J79 engines have the highest thrust-to-weight ratio in their class and provide low specific fuel consumption. The J79 produces more than 16,000 pounds of thrust, yet weighs only about 3600 pounds.

B-58 CREW WINS SAC BOMBING TROPHY

BERGSTROM AFB, Tex.—The J79-powered Convair B-58 Hustler, first U.S. Mach 2 bomber, recently demonstrated outstanding capability in its first SAC combat competition.

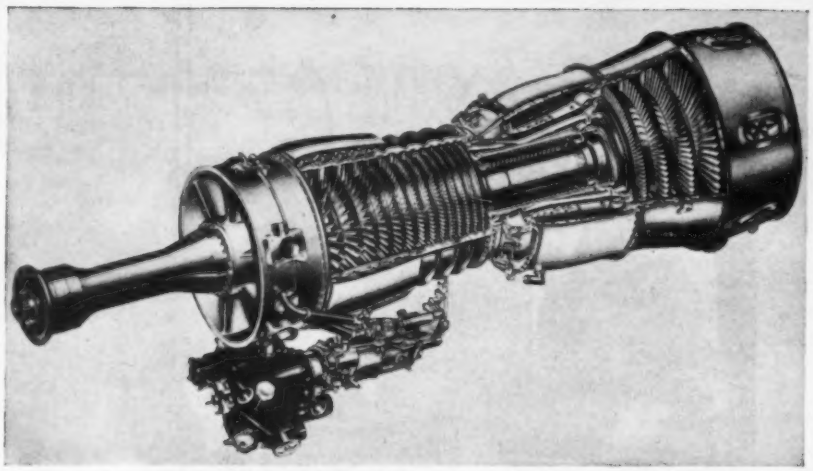


Alert sends crew hustling to B-58.

In the bombing competition, top individual score was recorded by Major Harold Confer and his crew from the B-58 equipped 43rd Bomb Wing. The Wing, which had flown the B-58 only six weeks, placed second in unit bombing and fifth in over-all competition for the Fairchild Trophy, won by B-52's of the 11th Bomb Wing.

The unit bombing competition was also won by 11th Bomb Wing, while J47-powered B-47's of the 340th Bomb Wing took the navigation award.

Aided by the B-58's ability to start its J79 powerplants while taxiing after cart-start of the number one engine, the Hustler crew swept the ground alert timing competition.



Cutaway view of General Electric's T64 turboshaft configuration, which exceeded all guaranteed specifications in preliminary flight rating test.

T64 Turboshaft Engine Exceeds Pre-flight Rating Test Guarantees

LYNN, Mass.—General Electric's T64 turboshaft engine recently passed its official preliminary flight rating test (PFRT), exceeding all guaranteed specifications.

G-E's Small Aircraft Engine Department, with Navy concurrence, ran three official tests on this version of the T64 gas turbine, two on JP-4 and one on JP-5 fuel. In each test all performance parameters, including acceleration times, oil consumption, starting time and deterioration were well within specification limits.

The engine developed 2780 shaft horsepower at military rating with a specific fuel consumption of 0.490 lb/-hp-hr, as compared to its performance guarantee of 2650 shp and 0.506 sfc.

Test approval of the T64-2 turboshaft automatically qualified the powerplant's direct drive version, the T64-6, for flight testing.

The T64-4 and T64-8, turboprop models of the engine, are also expected to receive official PFRT approval later this year.

All models utilize an identical power unit and differ only in reduction gearing and accessories. Under development for the Navy, the T64 is designed for large helicopters, fixed wing and VTOL, STOL applications.

CHECKLIST FOR FREE INFORMATION

For additional details on the Caravelle VII, fill in the coupon and return to:

General Electric Company
Section B206-17
1 River Road
Schenectady 5, N. Y.

NAME_____

COMPANY_____

TITLE_____

ADDRESS_____

Progress Is Our Most Important Product

GENERAL ELECTRIC

Plane, Train or Limousine?

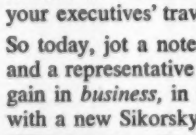
(*none of these, this is a helicopter!*)

Looks like a conference room, doesn't it? Well, it is in a way. The cabin of this new turbine-powered Sikorsky S-62 was designed by Raymond Loewy to make every trip conducive to meetings, study, work and even rest.

The turbine engine not only contributes to this atmosphere with its smooth, quiet operation but also has an unequalled record of reliability to recommend it. And because the mechanical components of the S-62 have been proven in over 1,000,000 hours of flight, periods between overhauls are four to five times longer than would normally be expected of new components.

This nine-passenger, boat-hulled Sikorsky S-62 is the newest addition to the family of helicopters you so often see in the news transporting government dignitaries both here and abroad. As it does for them, a Sikorsky helicopter will cut your executives' traveling time considerably.

So today, jot a note to Sikorsky Aircraft on your letterhead and a representative will call to show how your company can gain in *business,* in *time,* in executive *power* and in *prestige* with a new Sikorsky S-62 executive helicopter.



A New World of Mobility by

SIKORSKY AIRCRAFT

Stratford, Connecticut

A Division of United Aircraft Corporation

Third of a series

Is Local Subsidy Here to Stay?

Last month, *AIRLIFT* published letters from four local airline presidents commenting on this question. Here is the third installment in this provocative series

I HAVE every hope that the local service industry will one day be self-sustaining. Certainly this can be accomplished. Tools and incentives are at hand. Prospects are more promising today than ever before.

Our capability has advanced considerably by permanent certification and re-equipment. Our industry is now recognized by the general public, by business and by government as an integral part of air transportation.

The Civil Aeronautics Board is turning more attention to our problems. We believe the Board has the intelligence, the imagination and the will to solve them. The climate is particularly suitable for resolution of the subsidy problem.

Four major considerations are essential to self-sufficiency.

1. Equipment. Before a local can become self-sustaining it must have equipment capable of showing a profit with a reasonable load factor. This means an efficient, modern, jet-powered, short-haul aircraft, such as the Fairchild F-27.

More than 90% of our operations are being conducted with the F-27A. The first year our revenue passenger-miles rose 35 percent with relatively no change in operating authority. This is evidence that the public has accepted this aircraft.

This increase has been due largely to initial stimulation and cannot, of course, be expected to continue at the same pace. Nevertheless, this first objective is well along the road.

CAB paces turbine transition

The rapid transition of the local service industry to turbines has been paced by the CAB and supported by congress. The Board's full cooperation must be commended.

2. Certification in short-haul, high-density markets. Once the local carrier has equipment acceptable by the public, it needs an opportunity to use it in short-haul, high-density markets.

Service in these markets presently is being provided by the trunks as a by-product of their major operations. It is the long-haul, high-density markets that profit them most. The trunks' transition to big jets underscores this fact. It is to these markets that they must turn to pay for this costly equipment. Indeed, their survival depends on such markets.

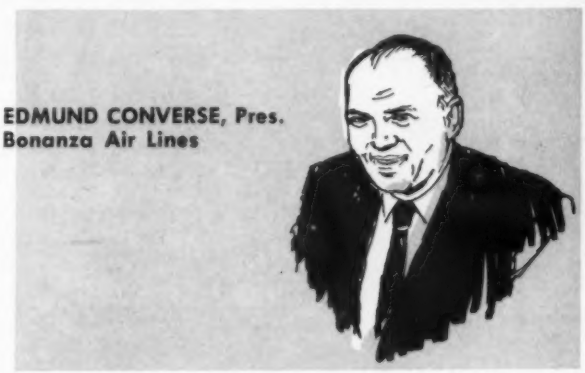
This provides CAB with an opportunity to fill the void as the trunks' transition proceeds. Service in these markets by local carriers, well equipped and interested, will mean services especially geared to the local need and will lead to an increase in traffic. The trunks will be a major beneficiary.

There are many short-haul, high-density areas which can be assigned exclusively to local service carriers without danger to the trunk route pattern. There are others to which the locals can be given access without prejudice to the trunks. The public will benefit, the locals will be strengthened, and subsidy will shrink.

In some pending cases the Board has this opportunity, while in others it is denying it. In the latter instance there is a wide chasm between the Board's policies and implementation.

The Board, in the early stages of a case, often restricts opportunity to meet its stated objectives, i.e., the authorization of services best suited to requirements of public convenience and necessity. It sometimes does this at the outset of a case by denying consideration of certain markets existing within the area involved.

By a procedural determination it precludes authorization of non-stop service to the local service applicants. It does so in spite of the fact that such markets present a major opportunity to reduce local service subsidy levels, and even



EDMUND CONVERSE, Pres.
Bonanza Air Lines

though each presents an opportunity to provide service with modern aircraft tailored to the needs of a local rather than a long-haul trunkline market.

Yet, under the restrictive provisions of such a procedural order, the issues are so confined that no matter what the record could show as to subsidy reductions, or future public needs, the Board would be powerless to authorize non-stop service by a local carrier.

3. Liberalized operation authority over present routes. This is related to No. 2 in that it, too, provides a means for route strengthening. Many segments are operated by local carriers on a multi-stop basis but are not receiving the service they require simply because the weak stations are provided identical service to that provided to the strong stations. This tends to depress traffic development at the strong stations, and over the segment as a whole.

4. Economic stability. The CAB has recognized that simplification in technique for subsidy consideration can be

BULLETIN FROM BOEING...

..WHERE CAPABILITY HAS MANY FACES

Minuteman, the nation's first solid-fuel ICBM, blasts from underground silo, left, in tethered firing test. Successful Minuteman firings cut test program, saving millions of defense dollars. Boeing is weapon-system integrator of the 6000-mile-range Minuteman missile, now under development.

FLYING COUSINS. You can cross a continent or an ocean in brief hours by Boeing jetliner, then fly to local airport or center-city in a helicopter built by Boeing's Vertol Division. Vertol helicopters are flown by the U.S. Air Force, Army and Navy as well as by the commercial carriers and armed services in many countries. Boeing 707s and 720s—most proved jetliners in the world—have already carried more than 10,000,000 passengers.

HOTSHOT TUNNEL. Here, in largest privately owned wind tunnel facilities in the world, future aircraft, missile and space-vehicle models can be tested at speeds up to 18,000 miles an hour. Many space-flight conditions can be simulated during tests. Decades of emphasis on research have enabled Boeing to pioneer nation-benefiting advances in vital areas of manned and unmanned flight.

SEAGOING TURBINES. Boeing gas-turbine engines power this high-speed oil company personnel boat as well as U.S. Navy minesweeping launches and landing craft. Light, powerful, compact Boeing shaft-drive turbines have scored many firsts: first turbine to power highway truck, fire engine, helicopter, locomotive and light airplane. Boeing turbines also serve in jet-engine starters used by U.S. Air Force and commercial airlines.

BOEING

JET AIRCRAFT, MISSILES, HELICOPTERS, TURBINES, WEAPON-SYSTEM MANAGEMENT, SPACE-FLIGHT VEHICLES AND SYSTEMS.

profitable. Efforts are now underway to establish a simplified yet workable class mail rate. A recent statement by member Alan Boyd notes that such a rate will be placed in effect next January 1.

Other actions, such as the decision to grant a rate of return of 12¾ percent to the local carriers, the fare increase granted the industry, and efforts to expedite existing mail rate proceedings, demonstrate the increasing attention directed to the problem of economic stability.

Without it there is little hope for self-sufficiency, for the attraction of additional working capital, for proper servicing of existing routes, or for development of new routes attuned to public needs.

The CAB has adopted a sound "use it or lose it" policy, designed to strengthen route systems without denying needed public services. If possible, simplified procedures should be adopted to permit carriers to end service upon reasonably short notice and without procedural delays.

The local service industry suffers the same wage pressures as trunks but hasn't the strength to withstand them. Small improvements in economic strength are more than wiped out by wage increases unrelated to productivity or ability to pay. Government agencies involved in these matters should direct more attention to this problem and insure that wage increases be more directly related to economic progress rather than to a carrier's eligibility for subsidy to finance such increases.

Tax relief necessary

Congress should abolish the transportation tax on passengers to permit further development of air travel in short-haul markets. Local taxing authorities should grant tax concessions to local carriers similar to those offered as an inducement to industry. Airport authorities should keep space rentals and landing fees at a minimum while carriers are subsidized.

Congressmen who seek air service through appeal to the CAB should seek payment for such services before Congressional appropriations committees. If such air services should later fail to develop the requisite volume of traffic, congressmen should withdraw further support for continuation of the unneeded service.

The local airline industry can be made self-sufficient within five years. This will require a carefully studied effort on the part of the Board and the carriers.

For some, it can be done sooner. It will require the cooperation of the public, local communities, the carriers, the CAB, and government agencies whose conduct can help or hurt the program. Let me say that we look forward today more hopefully than ever before.

EDMUND CONVERSE
Bonanza Air Lines

GWIN HICKS, Pres.
Lake Central Airlines

YOUR invitation to comment on subsidies mentions the local airlines' "remarkable record." I would say, "fantastic record." I also believe the record in revenue passenger miles truly reveals the flying public's need for our services.

Over the past 15 years we have had many handicaps: lack of a good image to project to the public; lack of industry status; extremely limited operations; under capitalization; limited budgets; an image as a second class citizen in the eyes of many public officials.

Now we have status. We are identified as the subsidized segment of the air transport industry. We have a fantastic record of public service without profit.

Yes, I foresee permanent subsidy for some cities on our systems under the existing route structure and standards of regulation. This stems from early DC-3 concepts.

I recognize changes for the better. Permanent certification, guaranteed loans, etc., indicate improved acceptance by a sympathetic congress, plus an enlightened CAB.

Support for cities on local systems is a mutual problem that can be resolved by the cities (prime beneficiaries), by trunk air lines (secondary beneficiaries), by our group of air lines (third beneficiaries), by congress and CAB (public servants) dedicated to providing and administering modern air service.

With our access to an informed press, supported with hard sell facts prepared by local industry groups (financial, manufacturing and supporting with goods and services), coupled with hard sell cooperation of trunk air lines, we can provide congress and CAB with improved policies and realistic controls for administration of public service revenues.

Subsidy for air service to some cities will remain limited. Congressional policies have long supported pioneering modes of transportation and provided subsidies based on public interest, national defense and postal needs.

With present public demands for service and our improving public status, we must get to work, stop our beefing, use the tools now available and work on developing new cost saving and traffic generating techniques:

A three-point program

1. Continue our education programs, enlightening congress and CAB on cost compared to benefits. We have been partially successful to date, pending rate of return cases, tariff increases, "class rate" and "use or lose it" policy announcement by CAB.

2. Continue vigorous selling to trunk managements and sales and public relations personnel, joining hands in convincing user, political and financial publics that our end product is service for public convenience and necessity.

Feeder and commuter services of Lake Central are as vital to jet trunk and international airlines' welfare and stockholders' interest as is their own interest in limos, taxis, hotels, rental cars, travel agency and city ticket offices, including VIP courtesy lounge facilities to get the traffic necessary for profits.

3. Continue to educate municipal, state and federal officials with the fact that local air lines are primarily in competition with the private auto—not with railroads, busses, transcontinental and global air lines or fixed base operators.

The record shows that the primary beneficiary of subsidy is the traveling public, not the stockholders of local air lines.

We in the industry must sell our services to the public. We can and we will, by using hard sell facts, aided by cooperation from the press (our public voice), major airlines (our partners), civic and legislative leaders (our servants) and the public at large (our customers).

The job is ours, nobody elses. We can reduce subsidy provided our national economy continues a normal, healthy growth. I believe it's sooner than many of our adversaries think, for the following reasons:

- CAB's recent policy of certificating locals into stronger travel markets without restrictions.
- A realistic rate of return decision—a big step in the right direction.
- Announcement by chairman and one CAB member of plans to implement the new class mail rate formula by January 1.
- Recent tariff increases in the general passenger fare case—averaging 10% across the board for locals. This really finances the needed requirements.
- The carriers' introduction of new equipment, coach and commuter, and no-reservations system plans, supplemented by innovations being introduced daily, spell lower unit cost plus better service and greater investor confidence.

The result should be profitable operations with carriers ready to plow back earnings for the greater task of tomorrow's needs. In other words, better relations all round.

GWIN HICKS
Lake Central Airways

THE economic health of the local service industry can only be improved through government regulation that recognizes the condition of its patients—the local carriers —and does something to maintain and improve their economic well being.

No doubt, much is desired in the regulatory field. The agencies involved, particularly the CAB and FAA, have the best of intentions, but somewhere between aspirations and results something is missing.

An example is the so-called rate of return which the CAB has allowed the carriers to receive in mail pay. The rates of seven percent for past period mail rates and the former rate of eight percent for future permanent mail rates have never been attained. This is evident in an examination of the carriers' balance sheets.

A recent Board order in the Rate of Return Case increased the future period rate to a minimum of nine and a maximum of 12.75 percent. But this action for patients whose economic health is precarious is like providing track shoes for an infant. The higher rate is only available to carriers with enough economic success to attract stockholders and increase equity.

Subsidy is target

The real objective is the elimination of subsidy. A realistic rate of return would improve economic health, but it could not sustain it without continued increases in subsidy unless greater opportunities were available for revenue hikes without corresponding boosts in expenses.

The boost in revenues can be attained by eliminating operating restrictions, by suspending trunkline services at numerous intermediate stops now served jointly with local carriers, and by extending to local carriers potentially profitable markets now served by trunklines.

In the local service area cases which the Board has been hearing, there is no doubt that the proposals outlined above were to be considered. Unfortunately, the results have not been encouraging. While some operating restrictions have been dropped and some profitable routes have been created, more routes have been awarded that have little if any economic potential and some operating restrictions still exist that are needlessly hampering.

Moreover, suspensions of trunkline authority usually have occurred only where the trunks have not opposed such actions, and most suspensions have not been profitable.

The Board believes, and local carriers agree, that one of the carriers' purposes is to provide service to smaller communities. But this objective must not be so overwhelming that it results in an unnecessary drain upon the taxpayer. In West Coast's opinion, this is the result of local area service cases decided thus far.

West Coast believes that remedies are needed if subsidy is to be virtually eliminated. The jet era is here. Trunklines, with large investments in pure jets, cannot continue to serve the intermediate markets without becoming split personalities. Intermediate cities will not tolerate outmoded aircraft.

Strengthened local service carriers with good economic health should meet these needs and can do so by more positive action. The "use it or lose it" policy should be toughened and exercised religiously.

Better cost control needed

Another way to achieve better economic health is greater recognition of cost control on the part of the local carriers. Too often regulatory agencies fail to understand the increases in capital requirements and overhead resulting from unnecessary regulation.

This has been evident from failure to recognize that the local service operation is different from the trunkline—particularly the pure jet trunk. A DC-8 or 707 operation differs from the F-27, yet the requirements are virtually the same under FAA regulations. CAB also requires the filing of the same reports by locals that are filed by trunks—plus some that the trunks do not file.

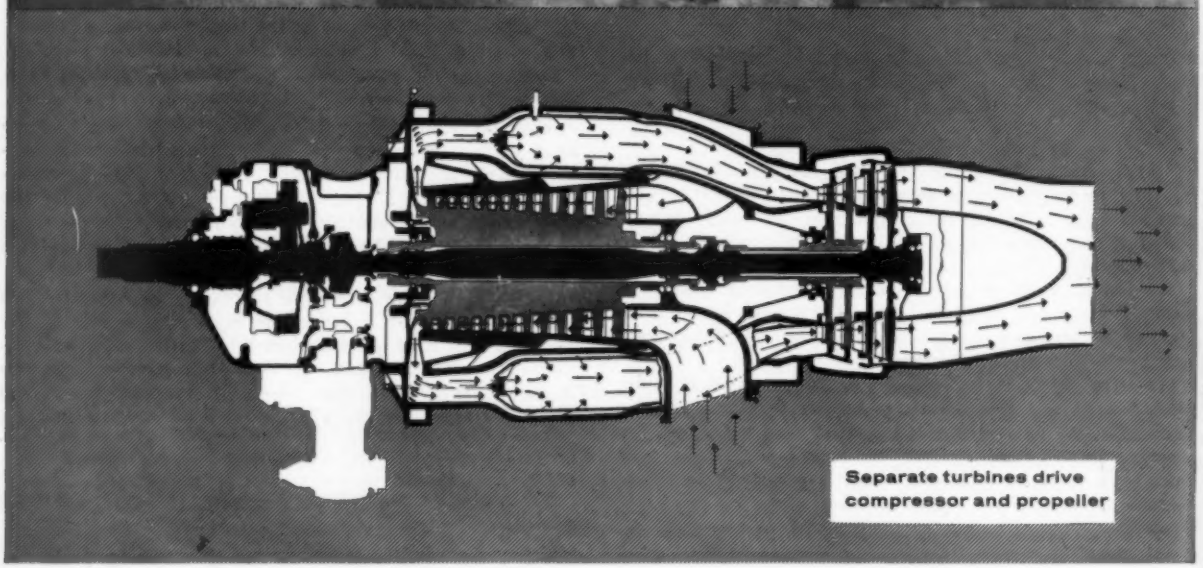
West Coast hopes that the regulatory agencies will do something soon to improve the economic health of the local carriers. Our stockholders are entitled to some consideration after 14 years—to date they have received no dividends. We believe that improved economic health and better potential earnings will eliminate subsidy and increase the number of investors believing in the future of air transportation.

NICK BEZ, Pres.
West Coast Airlines

NICK BEZ
West Coast Airlines

This series of letters from local airline presidents commenting on the subsidy issue will continue next issue with one of the three remaining correspondents, Leslie O. Barnes, president of Allegheny Airlines. In the months following will appear comments by Joseph H. FitzGerald, Ozark president, and Keith Kahle, president of Central Airlines. ■

Proteus turboprop achieves 2,400-hours overhaul life– over 1,000,000 hours in service...



...ANOTHER ENGINEERING ADVANCE BY BRISTOL SIDDELEY

The Proteus 705 turboprop powers the Britannia 102 airliners which ply BOAC's arduous Commonwealth routes. It was recently announced that this 3,890-hp aero-engine has been cleared for an overhaul life of 2,400 hours! This very impressive figure has been reached in just over three years service—a rate of increase never before achieved by any other engine, piston or gas turbine. And Proteus engines have now logged over 1,000,000 flying hours with 13 airlines and RAF Transport Command—all over the world. During this time, Proteus development has continued and later versions deliver even more power for a lower specific fuel consumption.

But it is not only in the air that the Proteus has proved its success. For derivatives of this free-turbine engine, backed by great operational experience, are giving the same outstanding service as powerplants for fast patrol boats and for industrial electrical generators.

For further information, please write to Bristol Aero-Industries Limited, 200 International Aviation Building, Montreal 3, Canada. Tel: University 6-5471.

BRISTOL SIDDELEY ENGINES LIMITED

Trunk Equities Still Far Off Form

$7.4 million net loss for first half despite traffic increase has discouraged even speculative support

By SELIG ALTSCHUL

There has been no material improvement in the investment position of the airline industry.

The long anticipated jet age and its stimulus for additional revenues has fallen far short in developing the expected level of earnings. Operating costs of the new jets have exceeded projections. Oppressive route competition continues to weigh heavily on airline earnings.

It is a strange anomaly when the domestic trunks can boast an increase of 7.6% in traffic for the first six months of this year and show a sharp reversal in earnings for their efforts. Their net loss of $7.4 million for this period compares with profit of $29.4 million for the same period in 1959. A swing of $36.8 million in reverse occurred on a traffic increase of 7.6%.

Action, not reasons

The lack of profit improvement is not beyond explanation. But the investor generally is not interested in reasons when viewing conflicting trends between traffic and earnings.

As a result, airline equities have failed to attract any worthwhile investment or even speculative support. This is apparent in analysis of airline book values and recent market prices (see table). Most equities continue to sell below book values.

Interestingly enough, Northeast (which has a negative book value) and Capital sell at the highest market premiums over book. No doubt this is a reflection, in part, of their franchise value for mergers.

The decline in Capital's book, however, also points up the fact that there is a deterioration hazard in stated asset valuations. Capital's book value per share declined from $13.54 to $4.06 per share from December 31, 1959 to June 30, 1960. Capital had an operating loss of $4,966,625 during this period. But it also wrote off some $1,800,000 or about $2.00 per share on obsolete aircraft and parts.

No longer can airlines feel certain of realizing capital gains as they dispose of older equipment. For many carriers, losses are almost inevitable. Under such circumstances, reported current book values do not fully reflect this built-in loss and may not be too realistic. It is certain that asset positions of most airlines are not improving either from inflationary trends on capital equipment or from earnings.

Every line has drawn down various credits on the premise that such loans would be supported by earnings which would shore up asset values. It was felt additional equity or equity-type money would be infused into the airline industry at the earliest opportunity.

Earnings have not developed as expected. As a dual consequence, it has been difficult to attract additional equity money and net worth positions have eroded. This has led to a condition where a number of airlines are exposed so that their debt ratios are showing in an embarrassing manner.

Also, cash flows (mostly depreciation charges plus retained earnings) have been hard pressed to meet current maturities as they become due.

But no management anywhere likes to dilute its net worth by selling below book value. This is the dilemma facing many airlines today.

Financial exigencies being what they are, measures are reported underway to bring in additional money.

National, for example, has filed to sell about $10 million in the form of convertible debentures. Additional financing, including the sale of its block of 400,000 shares of Pan American World Airways stock, which it is under CAB orders to sell, is also indicated.

National ahead

Incidentally, National currently appears to be ahead some $3.2 million from its original swap of 400,000 shares with Pan American. When the exchange was first made, both stocks were selling at approximately the same level. Now, National's equity is some 8 points lower than that of Pan American. It is small wonder that Pan American is pressing for a return exchange of the stock.

Further, Continental placed $12.5 million in 6½% subordinated notes with some investors. Funds so obtained, plus a $3 million subordinated note to be issued to Boeing in final payment for an airplane, will be used to roll over current heavy bank and other equipment maturities as well as to discharge existing obligations.

One main objective is to extend loan maturities while shifting some of the obligations away from the banks. But even after this refunding, Continental will still have a heavy debt structure to contend with. ■

EQUITY VALUATIONS—BOOK AND MARKET

	Common Shares Outstanding	Book Value June 30, 1960 (000)	Per Common Share	Market Price Oct. 8, 1960	Ratio Market/ Book
American	8,613,235*	$149,223	$17.32*	$18.125	105%
Braniff	2,948,119	36,767	12.48	9.25	74
Capital	909,659	3,696	4.06	5.50	135
Continental	1,834,400	17,018	9.28	6.125	66
Delta	1,122,233	38,902	34.66	25.25	73
Eastern	3,170,892	113,679	35.85	25.50	71
National	1,815,513	33,041	18.20	10.875	60
Northeast	1,783,688	(5,945)	(3.33)	3.875	..
Northwest	1,384,902	39,911	28.81	17.00	59
Pan American	6,607,342	136,150	20.61	18.50	90
TWA	6,674,155	119,408	17.89	11.25	63
United	4,069,104	143,555	35.28	28.625	81
Western	1,430,730	31,851	22.26	19.50	88

* Assuming complete conversion of preferred. ( ) Deficit.

Operating Net Off $85 Million As August Gains Are Year's Best

First solid signs of an upturn in the airline profits are beginning to show. The U.S. domestic trunks, after registering a $9.2 million operating profit in July, added $11.4 million in the black column in August.

But as a group, the twelve trunks are still far off their 1959 form financially. The operating profit through August is only $15.8 million compared to $90.6 million at the same time last year.

Five trunks still in red

Five trunks are operating in the red, headed by Eastern with a domestic operating loss of $6.6 million. Capital is down $5.5 million, National $3.3 million, TWA $2.8 million and Northeast about $2 million.

On the profit side, United showed the biggest gains, erasing its $1.5 million loss through the first seven months with a $5.5 million operating profit in August. However, it ranks only fifth among trunks for the eight months.

American Airlines' operating profit of $12.7 million through August is tops among trunks. AA is followed by three regional carriers, Delta at $6 million, Continental at $4.5 million and Western at $4.4 million. The operating gains of these four amount to $27.6 million or almost $11 million more than the entire trunk industry.

Of the four, American and Continental showed a drop in operating income from July. AA dipped from $3 million in July to $2.5 million and Continental from $947,000 to $935,000.

United gained from $3.2 million in July to $5.5 million in August, while Braniff, Delta, and Western showed moderate gains. TWA improved its $1.8 million operating gain in July to $2 million in August.

Capital pared its July loss of $355,000 to $186,000 in August and Northeast shaved its from $388,000 to $183,000. Eastern's increased from $810,000 in July to $971,000 in August and National's from $598,000 to $905,000.

Results for the first eight months point clearly to year-end results that will be far below expectations. Although the July 1 fare increase has helped some, a shift in traffic from firstclass to coach has tended to nullify its full potential benefit to airline balance sheets.

With the new jets carrying a high percentage of tourist seats, the more recent CAB approval of coach fares at 75% of firstclass should provide another financial assist. However, the effects of this second fare jump comes late in the year, probably too late to offer much help in improving the overall results for 1960. ■

Eight Months Finances

Here is a carrier-by-carrier report on results for August and for the year 1960 to date. Figures are in thousands of dollars and are for domestic operations only.

Airline	August	Year to Date
American	$ 2525	$12,691
Braniff	599	1938
Capital	(186)	(5508)
Continental	935	4500
Delta	290	6125
Eastern	(971)	(6579)
National	(905)	(3268)
Northeast	(183)	(1998)
Northwest	958	2281
TWA	2014	(2850)
United	5527	4062
Western	812	4391
Total:	$11,415	$15,785

Sales Lag New Capacity; Coach Continues to Gain

U.S. domestic trunk traffic, pressed by the influences of the transition to jets and a general fare hike, continues to show a widening breach between the amount of seat capacity added and the carriers' ability to fill these seats.

For the first nine months of 1960, while total available seat-miles of 36.98 billion are up to 9.1% over the 33.88 billion last year, total passenger-miles increased only 5.5%.

Expressed in load factor, the critical index of traffic trends, 1960 is down 2.08 percentage points.

Only in coach traffic, where the jets by their speed have upset the relative values of first-class and tourist services, are revenue passenger-miles holding close to capacity increases.

Coach drop less

Instead of a 3.6 point spread between first-class capacity offered and that sold, coach seat-mile increases exceed revenue passenger-mile gains by only 1.9 points. And although coach load factor has dropped from 1959, it is down only 1.04 points, exactly half of the first-class decline.

The penetration of coach into a stronger position in the traffic picture is evidenced by the sharp increase from 43.9% of the total revenue passenger-miles sold in the first nine months of '59 to 48.6% this year. In total capacity offered, coach stands at 45.4% this year compared to 41.7% last year.

Although coach represented 54% of all revenue passenger miles sold in July and 54.5% in August, its share dipped to only 51% in September. This presumably reflects normal curtailment of coach services at the end of the summer tourist season.

Instead of the 2.09 billion and 2.13 billion coach seat-miles offered in July and August, domestic trunks in September trimmed this 6.2% from the July level and 8.1% below that of August. ■

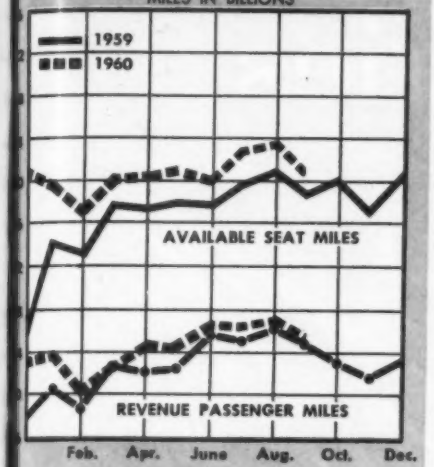
ON TIME BOXSCORE

June 1960

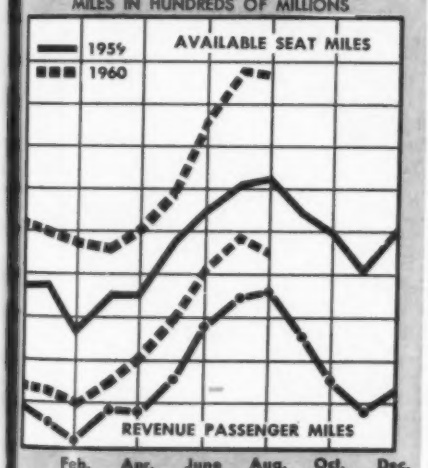
Airline Ranking	On time to 15 min. late
TRUNKS	
1 Braniff	84.5%
2 Western	84.0
3 Capital	80.7
4 TWA	80.7
5 United	78.6
6 American	77.5
7 Northwest	73.3
8 Continental	73.0
9 Delta	71.1
10 Northeast	68.9
11 Eastern	67.2
12 National	45.5
707 AND DC-8	
1 TWA	71.2
2 Western	70.7
3 American	67.8
4 Delta	61.0
5 Continental	58.1
6 Braniff	55.4
7 United	41.3
8 National	33.3
9 Eastern	26.9
10 Northeast	9.5
CONVAIR 880	
1 Delta	20.8
ELECTRA	
1 Braniff	80.0
2 Western	75.3
3 American	73.5
4 Northwest	44.4
5 Eastern	43.8
6 National	17.2
LOCAL SERVICE	
1 West Coast	100.0
2 Piedmont	92.8
3 Central	91.3
4 Frontier	90.0
5 North Central	89.2
6 Ozark	85.8
7 Lake Central	84.2
8 Trans Texas	82.5
9 Southern	78.0
10 Bonanza	70.5
11 Mohawk	66.5
12 Allegheny	66.3
13 Pacific	66.1

HOW'S TRAFFIC
Among U.S. Airlines

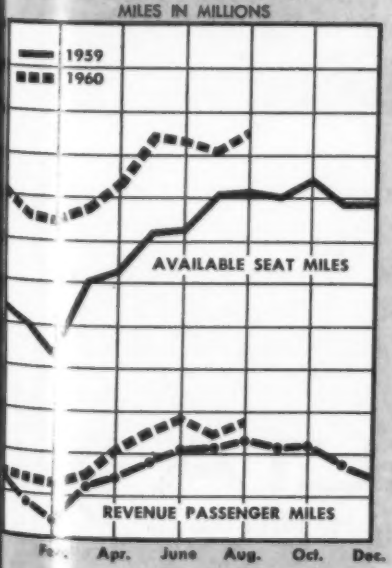
DOMESTIC TRUNKS
MILES IN BILLIONS



INTERNATIONAL
MILES IN HUNDREDS OF MILLIONS



LOCAL SERVICE
MILES IN MILLIONS



U.S. Airline Traffic for August
1960 vs. 1959

This complete summary compiled by AIRLIFT Magazine from Official CAB data.

	Revenue Passengers (000)			Revenue Passenger Miles (000)		
	1960	1959	% Change	1960	1959	% Change
DOMESTIC						
American	729	705	3.4	599,757	567,135	5.8
Braniff	189	173	9.2	92,816	78,014	19.0
Capital	313	338	— 7.4	128,146	137,269	— 6.6
Continental	130	113	15.0	90,089	80,057	12.5
Delta	279	255	9.4	148,819	129,461	15.0
Eastern	654	733	—10.8	342,917	402,408	—14.8
National	124	139	—10.8	72,951	83,987	—13.1
Northeast	138	130	6.2	46,233	48,089	— 3.9
Northwest	171	171	...	128,888	139,263	— 7.4
Trans World	445	485	— 8.2	453,857	484,052	— 6.2
United	735	673	9.2	547,464	481,420	13.7
Western	152	168	—10.5	92,226	96,926	— 4.8
	4,039	4,083	—0.6	2,744,163	2,728,081	0.6
INTERNATIONAL						
American	10	12	—16.7	10,421	11,759	—11.4
Braniff	6	5	20.0	12,833	9,378	36.8
Caribair	38	32	18.8	2,691	2,259	19.1
Delta	3	5	—40.0	3,562	6,407	—44.4
Eastern, Overseas	52	45	15.6	75,119	65,209	15.2
San Juan	42	34	23.5	65,245	53,090	22.9
Bermuda	6	6	...	4,310	4,912	—12.3
Mexico	4	5	—20.0	5,564	7,207	—22.8
National	3	8	—62.5	2,322	5,345	—56.5
Northwest	16	22	—27.3	38,642	41,654	— 7.2
Panagra	10	12	—16.7	16,699	17,648	— 3.7
Pan American, System	341	318	7.2	522,947	495,741	5.5
Latin American	115	138	—16.7	140,756	160,420	—12.3
Atlantic	179	138	29.7	237,656	191,337	24.2
Pacific	38	35	8.6	135,407	136,636	— 0.9
Alaska	9	7	28.6	9,128	7,348	24.2
Trans Caribbean	N.A.			N.A.		
Trans World	43	42	2.4	136,923	134,989	1.4
United	24	16	50.0	60,898	39,291	55.0
Western	4	5	—20.0	6,314	8,443	—25.2
	550	522	5.4	889,371	838,123	6.1
LOCAL SERVICE						
Allegheny	67	59	13.6	13,179	10,580	24.6
Bonanza	23	20	15.0	5,691	4,977	14.3
Central	16	15	6.7	3,085	2,972	3.8
Frontier	33	33	...	8,892	8,588	3.5
Lake Central	19	20	— 5.0	3,012	3,169	— 4.9
Mohawk	56	47	19.1	11,551	9,321	23.9
North Central	94	91	3.3	17,223	16,556	4.0
Ozark	51	49	4.1	9,030	8,561	5.5
Pacific	48	47	2.1	11,093	10,252	8.2
Piedmont	45	46	— 2.2	9,472	9,811	— 3.5
Southern*	15	17	—11.8	2,728	3,069	—11.1
Trans-Texas	26	27	— 3.7	6,130	6,451	— 5.0
West Coast	38	34	11.8	9,040	7,559	19.6
	531	505	5.1	110,126	101,866	8.1

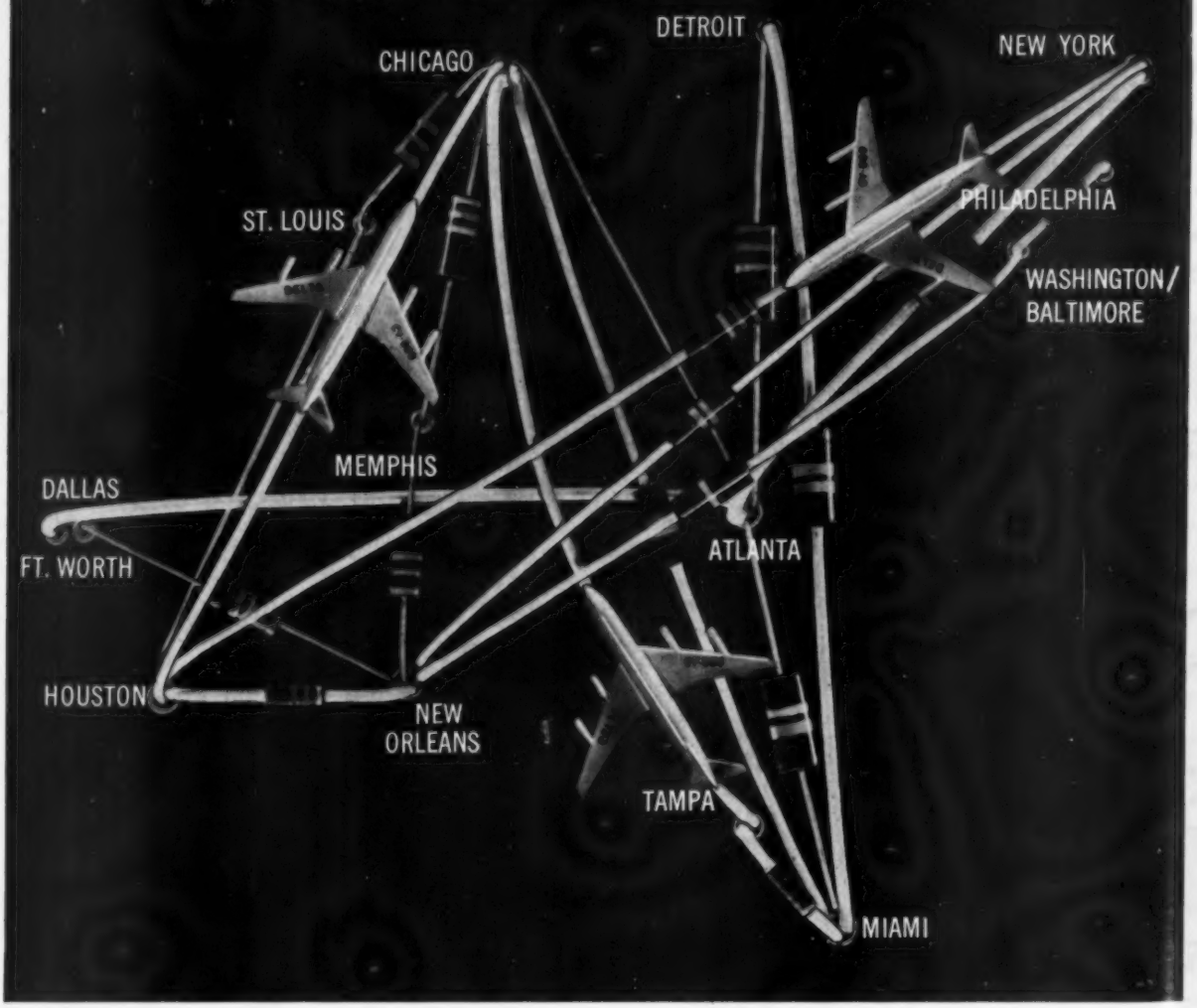
*Traffic influenced by ALPA strike.

HELICOPTERS						
Chicago	25	21	19.0	416	391	6.4
Los Angeles	5	6	—16.7	161	194	—17.0
New York	13	15	—13.3	260	290	—10.3
	43	42	2.4	837	875	—4.3
INTRA HAWAII						
Aloha	46	41	12.2	6,922	5,996	15.4
Hawaiian	60	59	1.7	11,876	10,745	10.5
	106	100	6.0	18,798	16,741	12.3
ALASKA						
Alaska	13	11	18.2	10,971	9,538	15.0
Alaska Coastal	9	8	12.5	852	862	— 1.2
Cordova	2	2	...	368	293	25.6
Ellis	8	8	...	466	486	— 4.1
Nor. Consolidated	4	4	...	1,415	1,296	9.2
Pacific Northern	16	17	— 5.9	16,080	17,061	— 5.7
Reeve	2	2	...	1,834	1,404	30.6
Wien	8	7	1.4	2,496	2,711	— 7.9
	62	59	5.1	34,482	33,651	2.5

ALL CARGO

(Ton-miles in thousands)	Freight			Total Scheduled		
	1960	1959	% Change	1960	1959	% Change
AAXICO	...	...	...	...	...	...
Flying Tiger	6,397,185	7,357,379	—13.1	6,484,822	7,449,611	—12.9
Riddle	N.A.			N.A.		
Slick	...	...	...	...	...	...
Aerovias Sud	425,273	454,025	— 6.3	425,273	454,025	— 6.3
Seaboard & Western	2,270,589	1,815,281	25.1	3,209,163	2,191,632	46.4
	9,093,047	9,626,685	— 5.5	10,119,258	10,095,268	0.2
	July 1960	July 1959	% Change			
Riddle for July, 1960 & 1959	883,655	1,564,235	—43.5	930,525	1,596,218	—41.7

Delta Jet circuits connect 15 cities



Half the nation is transformed to one community, with the new commuter circuits provided by Delta's Big Jets! It's now possible to commute between many cities, leaving in the morning, having nearly a full business day *there*, and return home the same evening. Delta Jets are amplifying business hours for thousands, helping them get *more* done faster! Commuter circuits insulate against fatigue by condensing travel time. The big switch is to Delta Jets.

First to fly the Douglas DC-8 and the Convair 880

DELTA

the air line with the BIG JETS

AIRLIFT

TECHNICALLY SPEAKING

By Joe Murphy

Poisson was wrong, says FAA . . . Double-decker for jets? . . . Maybe JATO yet for the F-27

The U.S. is coming!—But the British are way out front when it comes to realism in taking advantage of the reliability of jet engines. The Rolls-Royce Avon, which began service in Comet 4s only two weeks before Pan Am introduced Boeing 707s, has an overhaul period of 2300 hours.

U.S. carriers, although boasting a terrific reliability record with P&W JT3s and JT4s, are still down in the 1200 to 1400-hr. range, a difference of millions of dollars in operating costs. The reason, of course, is FAA's experimental approach to statistical quality control in monitoring time extensions.

As someone so cleverly phrased it at the recent ATA meeting in Kansas City, Mr. Poisson laid ground rules in 1837 that have stood for years and years, and it wasn't until 1960 that Mr. Quesada proved he was wrong.

Word of warning!—Learn from experience, says Frontier Airlines. If you're a local airline shopping for used transports from trunks who no doubt have made some of their own modifications, be sure to insist on a complete set of engineering drawings as one of the contract stipulations. If you don't, they're not easy to come by later—in a hurry, that is.

Two-level jet—That lower deck lounge which distinguished the Boeing Stratocruiser from all other postwar transports may find its way into a jet yet.

Pan Am is interested. Both Douglas and Boeing have been approached. Although Douglas hasn't decided to offer the bigger airplane it will require, Boeing has made a mock-up of the lounge. The aircraft would use engines in the 21,000 to 22,000 lb. thrust class, probably a fan version of the JT4.

Let's get busy—We were taken back quite a bit to hear that West Coast Airlines and others may be changing center sections on their F-27s within a year unless something is done to extend the 7600-hr. "safe life" limit placed on the structure during certification.

Later, the wings and cabin windows come in for change at 10,000 hrs. We can't conceive of how aircraft times could have grown so close to this limit without action.

JATO for F-27s—Aerojet-General is talking to Fairchild and Piedmont Airlines about launching a three-way project to put JATO on F-27s to recover the payload losses inflicted on the twin turboprop by unrealistic performance regulation.

It would permit full realization of operating weights planned for the F-27 before CAB had its SR-422 and subsequent nightmares. The big airlines and big manufacturers sure let the locals down when they left this battle for Fairchild to fight alone.

How the powers that be in FAA permitted the CAB's original disfigurement of the F-27s economic potential to remain in effect we'll never know. Doesn't anyone ever look at the record to see if a decision proves right or wrong? In case FAA hasn't heard yet, the Rolls-Royce Dart is a reliable engine. It has 3000-hour overhaul periods to prove it.

Exit fuel heaters?—Watch for offering soon by Phillips Petroleum Co. of an additive for anti-icing protection of jet fuels. It's called 55MB and is undergoing military evaluation.

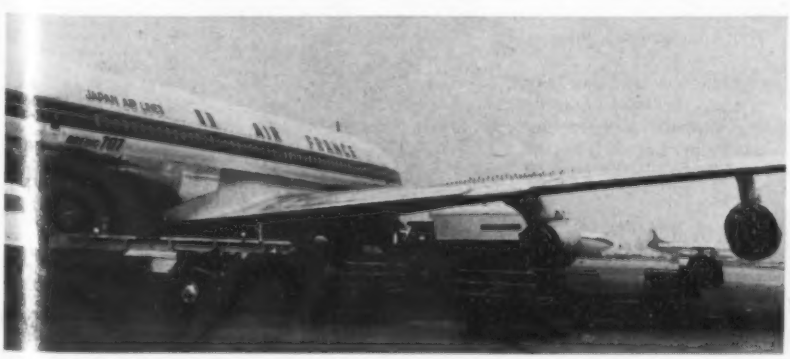
Convair A-1 with locals—The standout conclusion we reached at the meeting of local airlines preceding the ATA engineering and maintenance conference is that Convair is doing an excellent job helping out new operators of 240s, 340s and 440s.

Two documents that impressed us were a Convairliner Operations Digest and a Maintenance Digest. There is also a complete summary of service letters issued on Convairs. First copy is free to new operators, but additional sets may be had at $35 each.

AMF is busy—Keep an eye on American Machine & Foundry in the aircraft and airport equipment field. Firm has bought out Air Logistics' rights to the "wheel mover" for towing jets and has modified it to include starting and ground power provisions. It's a three-in-one ramp unit.

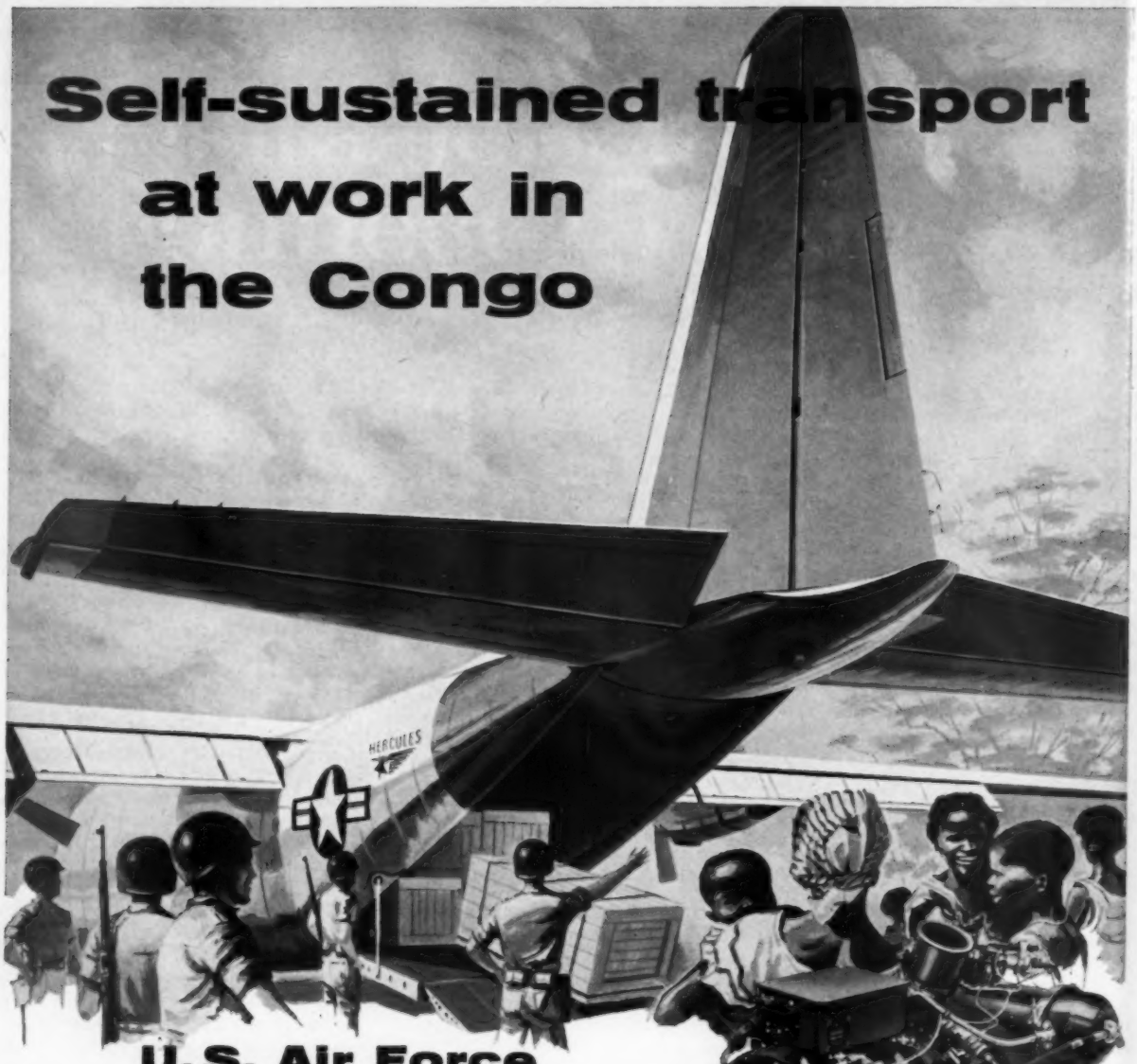
It also has extensive plans to help speed passengers and baggage through terminals. We're always impressed with the job AMF did with automatic "pin boys" for bowling. Maybe there's some hope yet for airport services.

Safety hint—Our suggestion to the heads of safety for all airlines. Get NASA to show you the films of model tests of a water pond covered with Mylar plastic to prevent over-runs with jets. We trust FAA will get moving fast on full-scale tests. Concept is being marketed by North American's Autonetics Division and looks like the best deal yet for jet airport safety.



SIGNS OF THE TIMES: In a rare photo, this Boeing 707 personifies a trend toward joint services. Markings of owner, Air France, are in big letters, those of Japan Air Lines are smaller. Operation is between Paris, Anchorage and Tokyo.

Self-sustained transport at work in the Congo



U. S. Air Force Lockheed C-130 Hercules

The recent crisis in the Congo has once again proved that the self-sustained aircraft is of vital importance in transporting cargo and passengers to and from landing fields where no ground support equipment exists.

The USAF Lockheed C-130 Hercules is designed to land and take off from extremely short runways carrying heavy loads of cargo or passengers. Equipped with an AiResearch gas turbine and starting system, the C-130 is entirely self-sufficient and can operate from the heat of the Congo to the cold of the Antarctic without the need of ground support equipment.

AiResearch gas turbine compressor GTC85 is built into the left wheel well of the C-130.

AiResearch air turbine starter ATS100 is installed on each of C-130's four turboprop engines.

Please direct inquiries to Phoenix Division.

THE GARRETT CORPORATION

AiResearch Manufacturing Divisions

Los Angeles 45, California • Phoenix, Arizona

Systems and Components for: AIRCRAFT. MISSILE. SPACECRAFT. ELECTRONIC. NUCLEAR AND INDUSTRIAL APPLICATION.

USAF Mulls Douglas Cargo Study

Project advances to service test stage with prototypes of new aircraft loading devices

Douglas Aircraft Co. has wound up the first phase of its far-reaching air cargo handling systems study and its recommendations are now being pondered by the U.S. Air Force.

The Douglas project, labeled the *463L Materials Handling Support System* now moves into the service test stage with several recommended items of equipment advancing to the hardware stage.

Douglas is working against a deadline of about January 1961 to define a test adapted to domestic U.S. Logair operations and about July 1961 for all MATS global logistic operations. The USAF is shooting at a target of 1964 to have the 463L system phased in completely.

Major components of the aircraft loading system, essentially a wedding of the Douglas rigid-pallet, side guide rail system of the C-133 and the Brooks & Perkins C-130 aerial delivery system, are:

• A standard pallet, measuring 88 by 108 in. Provision also is made for half-size pallets 54 by 88 in.; for one-quarter and one-eighth size boxes for cargo consolidation (see sketch) and two special one-quarter size food containers. One would be an expendable perishable food container, the other a reusable type for frozen foods.

• Rails and rollers—The aircraft portion of the system provides guide rails running the length of the fuselage with the pallet riding below the top flange of the rail. This serves as a hold-down device for the cargo load. Four rows of rollers also running the fuselage length permit easy movement of loaded pallets.

• Loading equipment—In addition to a wide variety of ground equipment now in use, Douglas has come up with five new pieces of terminal-to-aircraft loading devices. They include: (1) a mobile loader of 20,000 and 40,000 lb. capacity; (2) a 27,000 lb. capacity "wishbone" loader; (3) a single pallet dolly; (4) a 10,000 lb. fork truck; and, (5) an adjustable height trailer.

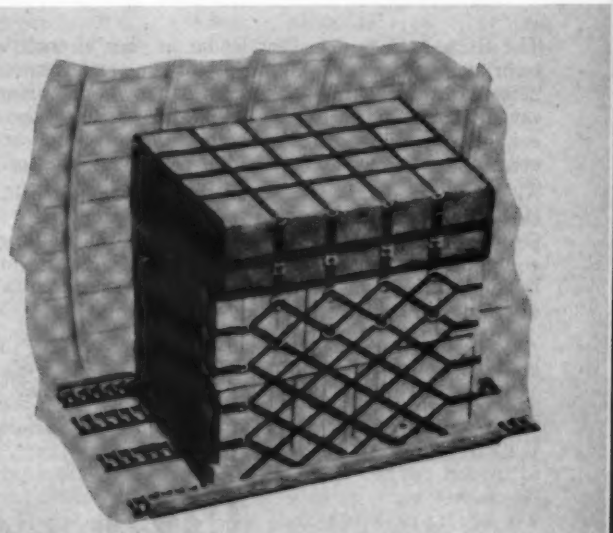
Among these, prototypes are being built of the 40,000 lb. loader, the wishbone loader and the 10,000 lb. fork truck. The latter calls for a 48-in. load center design compared to the usual 24 inches. A 6,000-lb. capacity fork truck also is recommended with the 48-in. load center. American Machine & Foundry is building all prototypes except the fork truck. Yale & Towne will handle the fork truck modification.

The Douglas study and its recommendations extend far beyond the scope of cargo aircraft loading, this being but one facet. In all, there are nine areas being explored: (1) customer requirements (cargo traffic); (2) cargo handling systems; (3) aircraft; (4) airport location and facilities; (5) freight terminal design; (6) terminal-to-aircraft handling equipment; (7) documentation; (8) communications, and, (9) personnel.

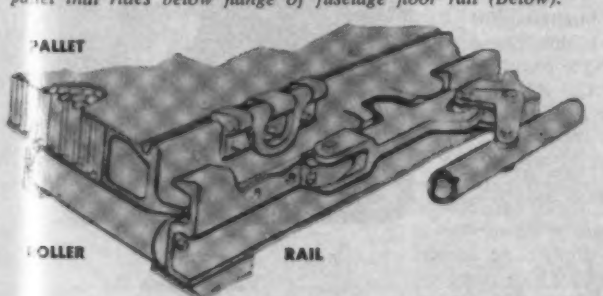
In its study of military cargo traffic, Douglas reviewed 1.5 million line items involving 2.5 million overseas shipments by all forms of transportation during 1958. Results showed 61% weighed 10 lbs. or less, 90% weighed 100 lbs. or less and 99% fell below 500 lbs.

Continued on page 53

PALLETIZED load in aircraft rides on four roller strips, is restrained by top flange on side rails (Right).



SKETCH shows honeycomb pallet construction and lip of pallet that rides below flange of fuselage floor rail (Below).



Let this weather-seeing eye help cut costs

of operating your executive aircraft

The RCA AVQ-50 Weather Radar in your aircraft will help your pilot to bring you to destination in better time and greater comfort than ever before. In terms of money saved, this may be important; in terms of time saved, it may be priceless. Being able to "see" the weather far ahead enables your pilot to select a smooth path through or between turbulent areas and often avoid the long costly detours formerly necessary.

All this is important to the effective and economical use of business and executive aircraft and makes for greater flying safety and comfort. These are the reasons why weather radar has been designated as required equipment on most commercial airlines. Now, by making the AVQ-50 lighter, simpler and more compact, weather radar is made available to aircraft with weight, power and space limitations.

Any of the authorized RCA Dealers listed on the opposite page, will be glad to give you full information. Or write: Radio Corporation of America, 11819 W. Olympic Blvd., Los Angeles 64, California.

RCA

The Most Trusted Name in Electronics

RADIO CORPORATION OF AMERICA

For full information about the RCA WEATHER RADAR get in touch with your nearest RCA authorized dealer listed below.

Aircraft Radio & Accessory Co.
Denver 7, Colorado

Airmar Radio Service, Inc.
Ronkonkoma, N. Y.

AiResearch Aviation Service Co.
Div. of Garrett Corp.
Los Angeles 45, California

Anderson Aircraft Radio Co.
Detroit, Michigan

Associated Radio Co.
Dallas, Texas

Atlantic Aviation Corp.
Wilmington, Del.

Butler Aviation, Inc.
Chicago 66, Illinois

Butler Aviation
Milwaukee 7, Wisc.

Butler Aviation
Washington, D. C.

E. Farnell & Co., Inc.
Palm Beach, Florida

Flightcraft, Inc.
Portland, Oregon

Florida Aviation Corp.
Miami 48, Florida

Gopher Aviation, Inc.
Rochester, Minn.

Minnesota Airmotive
Minneapolis 50, Minn.

Ohio Aviation Company
Dayton, Ohio

Piedmont Aviation, Inc.
Winston-Salem, N. C.

Qualitron, Inc.
Burbank, California

Reading Aviation Service, Inc.
Reading, Pa.

Remmert-Werner, Inc.
St. Louis, Missouri

Robbins Aviation Corp.
Pontiac, Michigan

Roscoe Turner Aeronautical Corp.
Indianapolis 21, Indiana

San Jose Avionics Co.
San Jose, California

Smith-Meeker Eng. Co.
New York 7, N. Y.

Southern Airways Company
Atlanta, Georgia

RCA®

Continued from page 51

Military freight is predominantly small in size, 63% of shipments being 1 cu. ft. or less and 90% not exceeding 10 cu. ft. It is low-density freight, too, with 56% of shipments being 8 lbs./cu. ft. or less and 76% falling below 15 lbs./cu. ft.

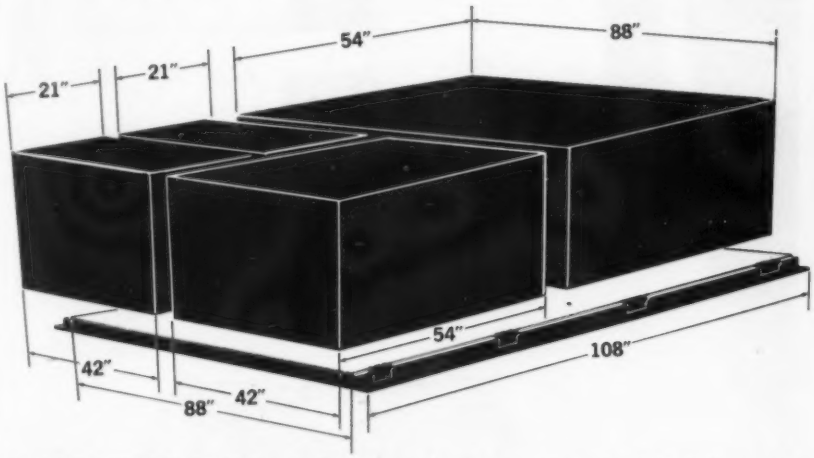
More than 30% of Air Materiel Command shipments were consolidated packages which tended to move by slower means of transportation. This consolidation saved cost, but was inclined to increase the transit time.

The predominant transportation for AMC shipments was parcel post, either air or rail which accounted for 67% of the total. Next was Logair, handling 10% of all AMC shipments.

Although Douglas has completed the first phase of its 463L system work for the Air Force, the project is far from complete. Some of the proposals may never be adopted. Others may see considerable modification as the result of upcoming service tests.

However uncertain the outcome of the program at this time, one thing is evident. All past research into cargo handling is being brought together in one place for review. There never has been a better opportunity to ponder the ultimate system.

As a good index of the Air Force's intent at arriving at one, it has spent some $600,000 to date on the 463L study and plans to spend more before the project is through. ■



SKETCH SHOWS SHAPE and dimensions of cargo containers for full, half, quarter and eighth-pallet shipments.

ATA Formula Updates Standards

A brand new ATA formula, bearing little resemblance to its predecessor of 1955 vintage, is off the press at Air Transport Association. Allowing but a brief period for dissemination, it becomes the bible for comparing new transport operating costs.

Designed to leave little to interpretation and narrow the opportunity to "color" a proposal in favor of an airplane, the 1960 formula contains these major changes.

- Addition of applied maintenance burden (overhead) in computations.
- Definition of block fuel and minimum fuel reserve. Also sets 8.1 lbs. as standard weight for synthetic jet oil.
- Revision of depreciation data. Airframes and spares are depreciated in 10 years to 15%; engines, spares and props seven years to 15%; radio five years to zero.
- Complete revision of block speed formula to take into account ground maneuver and air maneuver time.
- Modernization of crew cost computations by adding new factors not before considered. Third pilot costs, for example, are expressed as 75% of copilot except for the travel expense factor which is identical.
- Revision of all curves and charts. Pilot hourly cost versus speed charts are extended into two new speed ranges —600 to 1,000 mph and 1,000 to 1,600 mph.
- Complete change of turbine engine maintenance labor curve, relating costs to engine thrust instead of weight. Engine maintenance material costs is related to engine price, not current price as in the past.

On this last item, formula sets new limits on spare parts consideration. If all individual parts can be bought at the same price as an assembled engine, the spare parts factor would be 1.0. If not, must be increased to 1.50. ■

The first version of *Saturn* will be 185 feet tall . . . 21 feet across the base . . . will contain 14 rocket engines!

Douglas-built second stage is as tall as a 5-story building.

The rocket that will lead the way to space travel is now in development

Space researchers at Douglas Aircraft are already working on the design and construction of the second stage of the huge NASA *Saturn* rocket.

Saturn is the first program which is designed, from the ground up, to provide the capability of putting tons of payload into orbit or thrusting manned capsules beyond the earth's pull. It will initially be able to orbit 20,000 pounds around the earth, or deposit 6,000 pounds on the moon.

Future configurations of *Saturn* will have even greater thrust and payload, paving the way for round trips to the planets.

Fantastic as these predictions sound, they are the solid convictions of the men at Douglas whose skills have been behind the production of nearly 30,000 rockets, missiles and space vehicles. These include the *Thor* IRBM which has boosted more successful space payloads than all other U.S. boosters combined.

DOUGLAS

MISSILE AND SPACE SYSTEMS • MILITARY AIRCRAFT • DC-8 JETLINERS • TRANSPORT AIRCRAFT • AIRCOMB® • GROUND SUPPORT EQUIPMENT • ANTI-SUBMARINE WARNING SYSTEMS

Collins Shows Lightweight Weather Radar

Weighing 48.9 lbs., this new X-band unit is aimed at local transport and executive markets

By PHIL GERACI

A new, lightweight weather radar which tips the scales at a modest 48.9 lbs. and requires only 320 watts of AC power was unveiled at the NBAA convention last month by Collins Radio Co.

Following the traditional trend toward miniaturization via transistors, the X-band, pulse modulated unit contains only eight tubes. Seventy-three transistors are used in this brand new design which can be operated from a strictly AC power supply.

Although the unit is available with a standard PPI, another innovation of recent years—the bright display indicator—is also available. With the bright tube a hood is not required for viewing.

Versatility is a feature of the WP-103. Three versions of stabilized antenna are available, 12 in., 18 in. and 30 in. diameter. Stabilizing the antenna means that the instrument will constantly pinpoint weather conditions dead ahead, despite an aircraft's pitch and roll.

The WP-103 can peer into the weather for 150 nautical miles ahead of the aircraft. The antennas make a 120 deg. sweep once every second, and can be tilted downward or upward 15 deg.

Both standard and bright-tube indicators provide 30, 60 and 150 nautical mile range selections. Range marks are electronically generated. For nighttime operation, an adjustable polaroid filter is provided to dim the bright tube indicator. The pilot can also vary the presentation from conventional yellow-green to red.

With a standard PPI and a 12 in. antenna, the unit is tagged at $10,980. With the 18 in. antenna the price is $11,300. With the bright tube indicator and a 12 in. antenna, the equipment costs $14,240. Combining the 18 in. antenna with the bright tube indicator boosts the cost to $14,560. Prices are not yet firm on the 30 in. version.

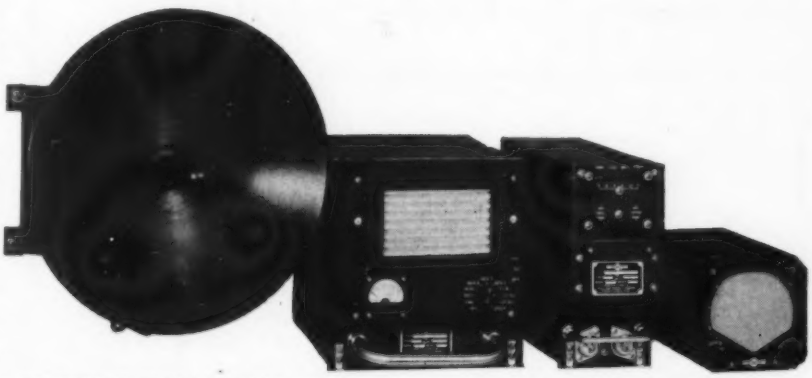
A number of airlines are reported by Collins to be looking at the WP-103.

One local service carrier—Mohawk—has announced plans to lease 15 units with an option to purchase.

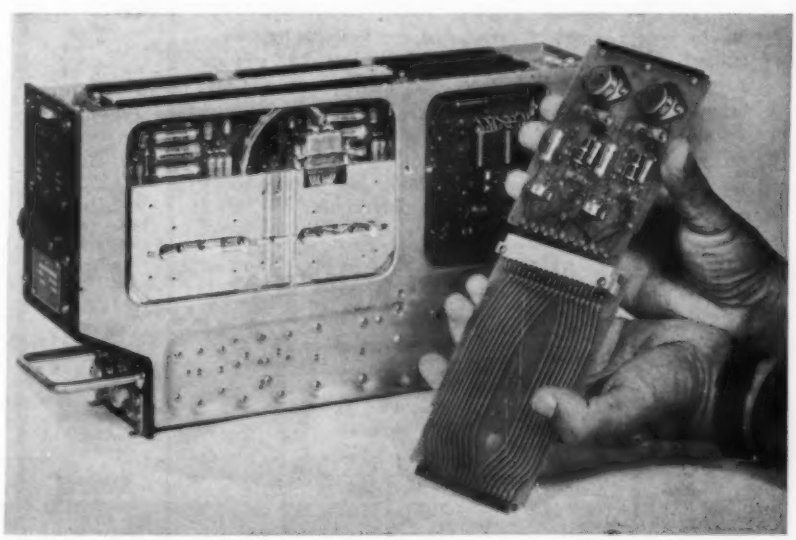
The WP-103 slices four pounds from its nearest competitor, according to Collins engineers, and requires 25 percent less rack space. The unit fits in one ¾ and one 3/8 short air transport rack.

Output power is 20 kw. Altitude ceiling is 35,000 ft.

Five components comprise the basic system: 374A-3 receiver/transmitter, 776C-3 synchronizer, 561G-3 control



COLLINS RADIO'S WP-103 weather radar consists of (from left): antenna; receiver/transmitter; synchronizer; indicator unit, (model shown is standard PPI).



PRINTED CIRCUIT cards containing components slip into top of equipment, can be removed individually for rapid servicing. Shown is synchronizer unit.

ALL OVER THE WORLD

PAYMOVER®—CHOICE of the World's Leading Airlines

Air France
American Airlines
Braniff International Airways
British Overseas Airways Corporation
Capital Airlines
Continental Air Lines
Eastern Air Lines
Flying Tiger Line
Japan Air Lines
Lufthansa-German Airlines

The Frank G. Hough Co. is the only manufacturer to successfully design, produce and deliver towing equipment in the 22,500 to 35,000 lb. drawbar class to all these top airlines. In fact, "PAYMOVER" tractors are not only the choice of the leading national and international airlines for handling their largest jet aircraft, but of manufacturers and ground-handling contractors too.

We accept this overwhelming preference for "PAYMOVER" tractors as a challenge to continually improve and keep "PAYMOVER" design abreast of the future needs of the aircraft industry.

The complete line of "PAYMOVER" towing tractors also includes smaller units (as low as 2,500 lb. drawbar) for towing, pushing and other prime mover work at truck and railroad terminals, piers and industrial plants. Complete details and specifications will be supplied at your request.

National Airlines
Northeast Airlines
Northwest-Orient Airlines
Pan American-Grace Airways
Pan American World Airways
Belgian World Airlines
Trans-Canada Air Lines
Trans World Airlines
United Air Lines

HOUGH®

THE FRANK G. HOUGH CO. 8-E-2
LIBERTYVILLE, ILLINOIS
SUBSIDIARY — INTERNATIONAL HARVESTER COMPANY

THE FRANK G. HOUGH CO.,
997 Sunnyside Ave., Libertyville, Ill.

Send data on "PAYMOVER" tractor of .....lbs. drawbar effort

Name
Title
Company
Street
City State

kit, 493A-4 indicator and 537F-7 12 in. dish antenna. The 18 in. and 30 in. antennas are offered as optional equipment.

Maintenance is vastly simplified by extensive use of printed circuitry. Trigger and gating circuits, I.F. circuitry, sweep and deflection circuits, range, video and servo amplifiers are designed on individual printed circuit cards which can be removed and tested individually to locate defective components.

For quick repair on the line, a defective card is simply replaced. The card is then returned to the shop for bench testing and repair. ■

Paperwork

NWA Cuts Weather Chart Copy Time With Thermo-Fax

Northwest Airlines has tied a Thermo-Fax office copying machine to weather reporting at its Minneapolis-St. Paul home office and trimmed better than 99% from chart duplication time in the bargain.

The laborious procedure used to consume upwards of half an hour when charts were redrawn by hand. Now it takes four seconds.

Northwest duplicates upper air prognostic charts for delivery to its New York flight dispatch office. To speed the job, 14 Minnesota Mining and Manufacturing Co. machines, which will reproduce copy up to 14 inches wide, have been thrown into service.

Thermo-Fax is a standard office copier used by hard-pressed secretaries across the country. But Northwest is one of the first to adapt this dry-copy process to weather charts.

"Eight different divisions located on the third floor make duplicates (on our Thermo-Fax) in less time than it would take to get halfway downstairs . . . to our duplication department . . . on the bottom floor." So says T. W. Cummins, flight operations director.

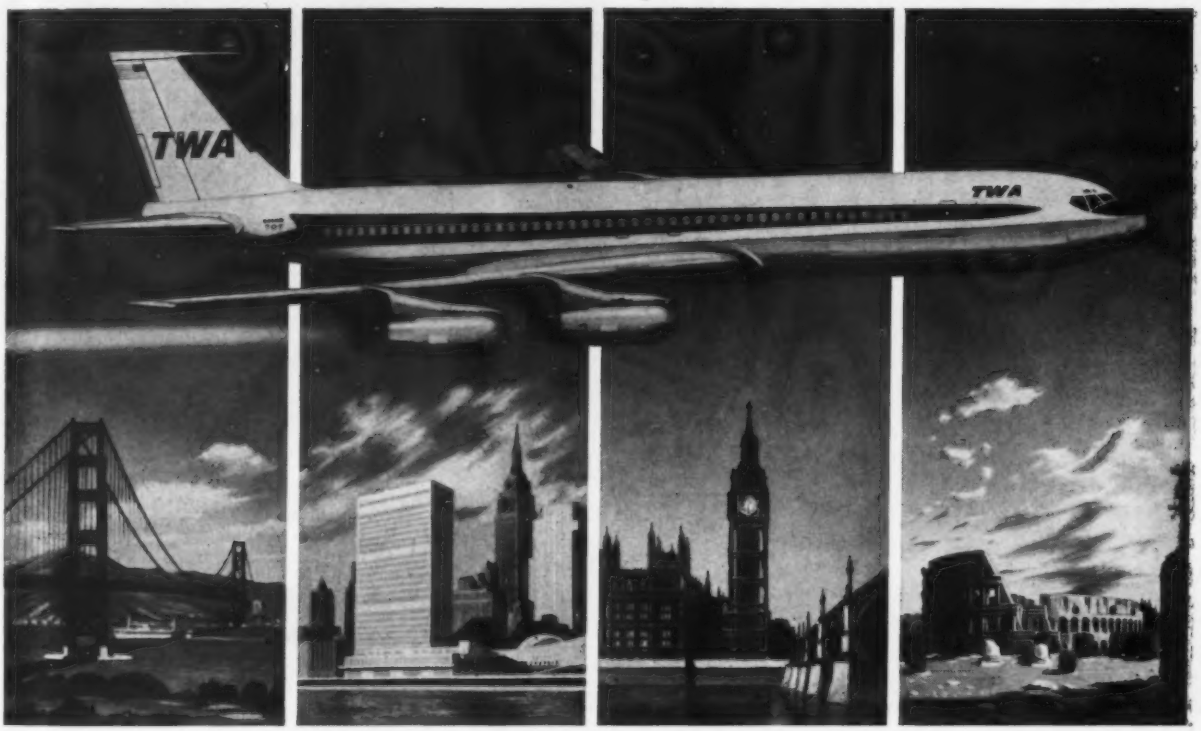
"The Thermo-Fax has saved us three-fourths of the time of our former procedure," he says, and attributes a several-hundred-dollar saving over the past year to the boost in copy speed.

The carrier needs 1,800 duplicates a month—letters, bulletins, memos, accounting worksheets and press clippings, in addition to weather charts—and figures that it would take a typewriter-pounding secretary a month to do the job. The Thermo-Fax knocks it off in less than a day.

Thermo-Fax is a dry-copy, reflective process which makes equal-size duplicates of originals up to 14-in. wide in a single pass through a desk-top machine. ■

TWA THE SuperJet AIRLINE

is the only airline flying across the United States... across the Atlantic to Europe...and across Europe



TWA JETS now serve LOS ANGELES · SAN FRANCISCO
KANSAS CITY · ST. LOUIS · CHICAGO · DETROIT · NEW YORK · BOSTON
PITTSBURGH · PHILADELPHIA · WASHINGTON–BALTIMORE · MIAMI
LONDON · PARIS · ROME · LISBON · FRANKFURT · MADRID · ATHENS

FASTEST COAST-TO-COAST

Call your travel agent or nearest TWA office

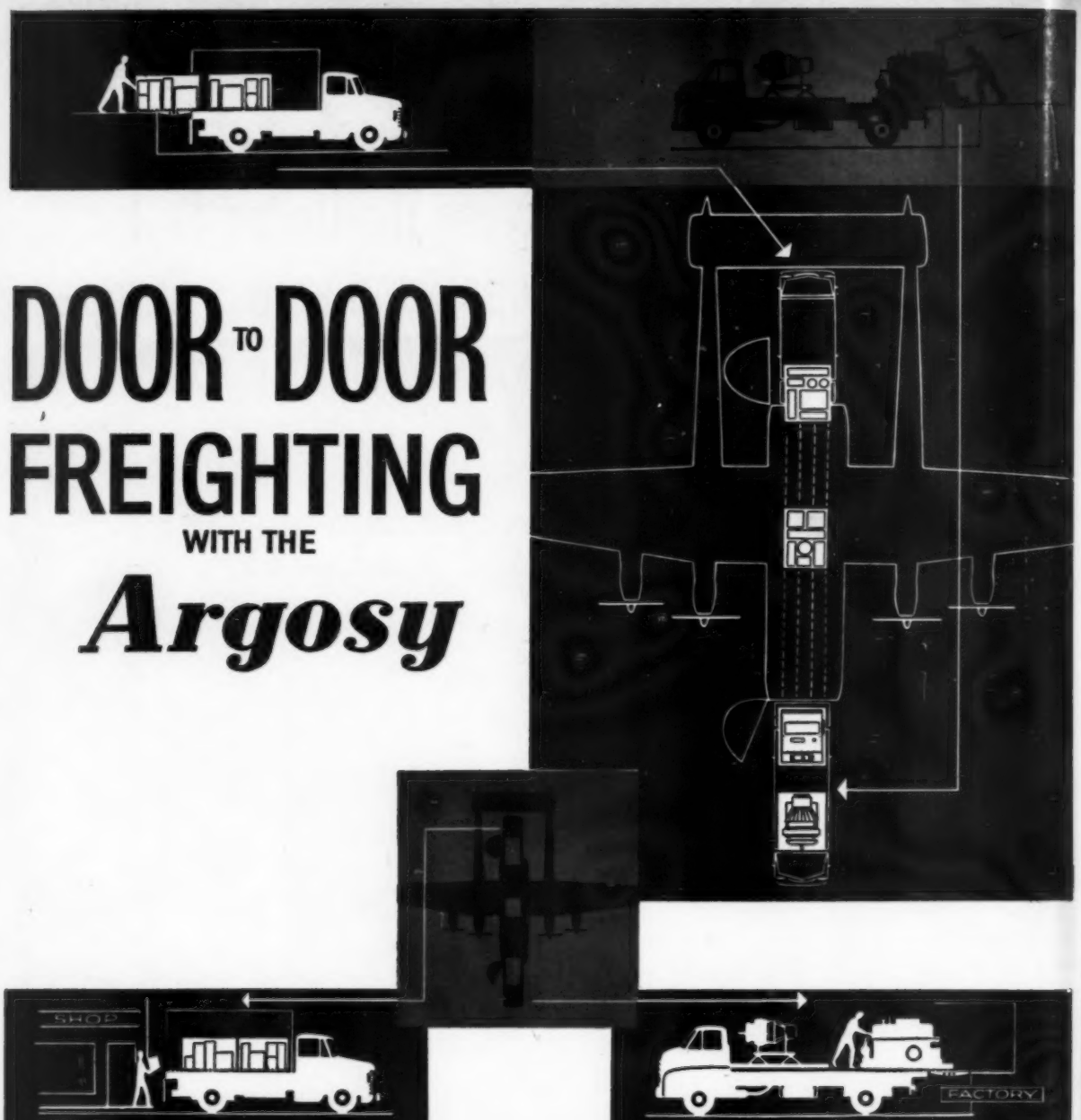
TWA

*THE SUPERJET AIRLINE**

Call your travel agent or nearest TWA office

The only airline flying across the United States in 4 hrs. and 30 mins.

*TWA THE SUPERJET AIRLINE is a service mark owned exclusively by Trans World Airlines, Inc.



DOOR TO DOOR FREIGHTING WITH THE *Argosy*

The revolutionary Rolamat-Argosy system of unitized loading

One pallet, one waybill—one streamlined operation door to door. That's the revolutionary air freighting system with the Rolamat-equipped Argosy.

Small parcels are built up on the pallet, the unitized load rolled onto a truck and straight from the truck into the Argosy.

Pallets can be linked together to take heavy bulky freight, such as machinery. No packaging is needed. Loads up to 13½ tons, less than 6 ft. 8 ins. high and 8 ft. 8 ins. wide, can be slid easily into the Argosy's 47 ft. long freighthold.

A complete turnround at the airport takes only 20 minutes, including refuelling.

Off-loading is just as easy. The cargo is rolled onto the lorries backed up at both ends of the fuselage.

No special handling technique is required—lifting trucks and cranes can thus be completely dispensed with.

Rolamat saves time, saves trouble, saves money, saves labour, saves warehouse space. Yes sir, things really *move* with the Rolamat-Argosy system of unitized freight handling!

Designed to bring the cost of air freight down to earth

HAWKER SIDDELEY AVIATION 32 Duke Street, St. James's, London, S.W.1.

Landis Calls for Dynamic Leadership

By J. F. LARSH
Contributing Editor

Sayen vs Landis—In a letter to all pilots, Mr. Landis has taken a position diametrically opposed to that of Mr. Sayen's administration. Mr. Sayen's supporters argue that Mr. Sayen only does what the pilots tell him to do; Mr. Landis' supporters state that if this is so he is functioning only as a clerk, however, not on a clerk's salary ($45,000 with all benefits). They claim ALPA does not need an errand boy but a dynamic leader.

Washington representation — Mr. Sayen's supporters claim that he is doing as much as anyone can in regard to representing the pilots with governmental agencies in Washington. To this, Mr. Landis has said, "The Association's top executive officers are not close to Washington and thus familiar with moves as they are being contemplated. Some of it is due to delayed or ineffective representation before the agencies themselves."

To back up his position, he cites the attempted intervention by ALPA in the Southern Airways' mail subsidy increase. ALPA did not intervene until after the subsidy was granted.

Another case cited is the Brownsville Tampico Route Suspension Case in which ALPA representatives did not appear at the hearing to present evidence and their brief was filed with the CAB after the deadline date. As a result, the CAB wrote ALPA that, due to their ineffective representation, their arguments could not be considered.

Industrial unionism—Mr. Sayen and his executive committee, in complete disregard of their own bylaws, (Illinois court decision, October 11, 1960) placed a trusteeship on the stewards and stewardesses union.

In effect, this would combine the unskilled non-professional flight attendants (turnover rate 50% per year) with the professional highly skilled pilots whose turnover rate is only one-half of one percent per year. If they are made members of ALPA, they will become a large block of votes that can be used politically.

Whoever controls the flight attendants will control the entire union because in a short time there will be more flight attendants than pilots due to the transition to jets (four flight attendants to every two or three pilots).

In such similar cases, the benefits to the skilled workers become out of proportion to those of the unskilled workers because the voting strength is held by unskilled.

Mr. Landis takes the opposite position. He states, "their problems, their pay rates and duties are so dissimilar to those of the pilots that amalgamation of pilots with any dissimilar craft should not be attempted.

"However, continuing understanding by the pilots of their problems and by them of the pilots' problems is essential. A working relationship that would not undermine the independence of the pilots but which would tend to coordinate the acitivities of all phases of the industry is, in my opinion, desirable."

85 hours—The two candidates are opposed in regard to this issue. Mr. Sayen's administration has stated a reduction in hours "cannot be obtained even with all the resources of ALPA."

Mr. Landis wrote the ALPA membership, ". . . in the light of their (the pilots) contribution to increased productivity and the physical and psychological burdens that jet pilotage places upon them, the so-called 1-2-3 package formula and other duty rigs devised fail in my opinion adequately to compensate for these factors.

"This problem calls for review with emphasis on the desirability of reducing the 85-hour maximum as well as increasing basic pay rates."

ALPA politics—At a recent meeting of EAL Council 51 in New York, both Mr. Sayen and Mr. Landis were invited to talk with the pilots of that council. Mr. Landis accepted and appeared, receiving an overwhelming endorsement. However, Mr. Sayen did not appear, advising the pilots that he did not intend to do any politicing. Those familiar with politics in ALPA take this with a grain of salt, since President Sayen is known as one of the most vigorous politicians ALPA has had. No doubt what Mr. Sayen means is that he will do his politicing through others by word of mouth and whispering campaigns with no-holds-barred when the board of directors meets at the convention during November.

ALPA board of directors—Have they lost control? According to a recent court decision: (1) The ALPA membership can be assessed for anything; (2) Less than a majority of the board of directors can authorize an assessment; (3) A ballot may include any number of propositions with only one place to vote; (4) The president is not required to inform the board of directors of all pertinent data and information on the subject ballot when requesting their vote.

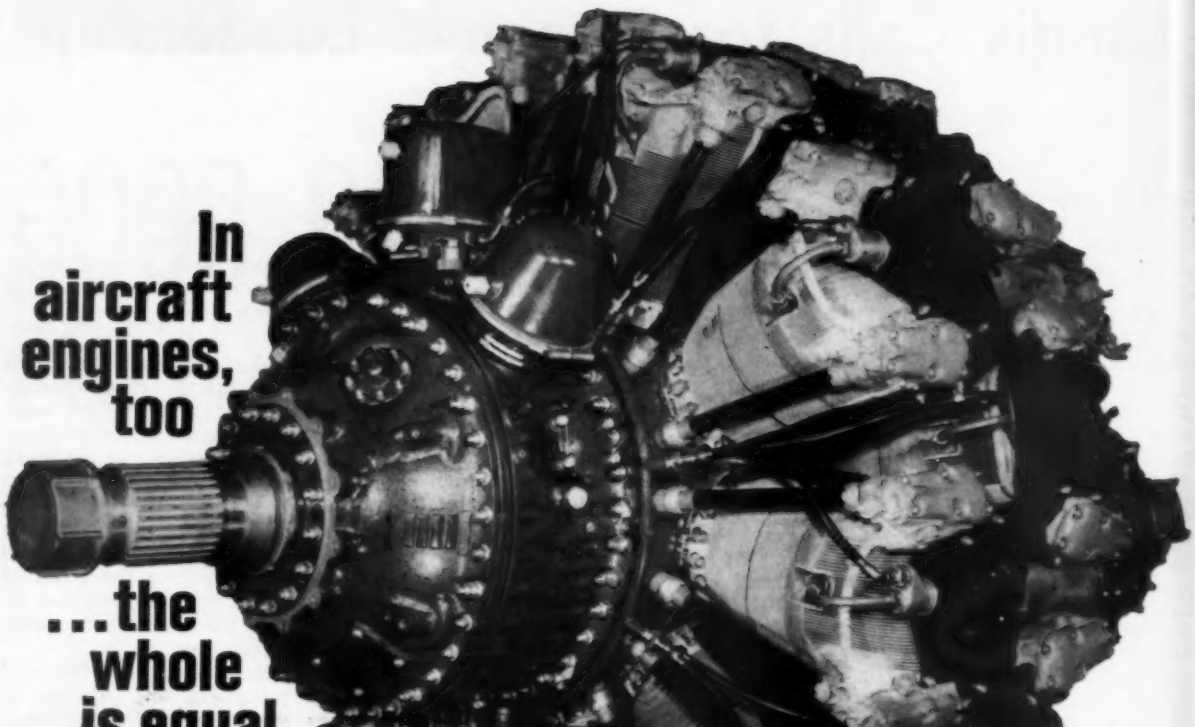
The board of directors is by-passed in the processing and hearing of charges against any of their fellow pilots and, should an interpretation of their constitution and bylaws be necessary, less than a majority of the board of directors can do this.

Apparently, the ALPA board of directors, by carefully placed resolutions, has had its authority taken away and in effect delegated to international officers.

A more recent indication of the board of directors' loss of control in ALPA was a decision by Mr. Sayen that James M. Landis, his opponent for president of ALPA, was not a bona fide candidate under the ALPA Constitution and Bylaws and, therefore, was not entitled to the ALPA mailing list for political purposes.

Obviously, Mr. Sayen hopes to prevent James Landis from having the opportunity to address the ALPA board of directors at the November convention. Apparently the only way Mr. Landis can be given this right is by a two-thirds vote of the board of directors.

Mr. Landis' supporters state that if a leading citizen of the caliber of Mr. Landis is not declared eligible to be a candidate, they may walk out of the convention. It will be interesting to see what action the ALPA board of directors takes at the November convention to reassert its authority within the union.



In aircraft engines, too ...the whole is equal to the sum of its parts

An engine is only as dependable as its component parts. That is why Pratt & Whitney Aircraft engineers are never through designing, testing and refining. They are guided by this basic rule: Only the best is good enough.

When your engine needs replacement parts, ask yourself this: Are the parts equal to the whole? Parts not designed to Pratt & Whitney Aircraft engine requirements can wear out prematurely, cause severe wear and damage to other components. And remember, similar appearance does not always mean similar quality—your engine soon detects a difference that may escape your notice.

When you repair or overhaul a Pratt & Whitney Aircraft engine, make certain that replacement parts are original equipment parts. They are quickly available direct from Pratt & Whitney Aircraft or its authorized distributors in the United States and Canada.

PRATT & WHITNEY AIRCRAFT
East Hartford, Connecticut

CANADIAN PRATT & WHITNEY AIRCRAFT CO., LTD.
Longueuil, P. Q., Canada

NUNNELEY, JR.

LEDERER

WARDEN

BROWN

IN THE AIRLINES

Emory T. Nunneley Jr., former CAB general counsel and more recently general counsel of Investors Diversified Services, Minneapolis, elected v.p. and general counsel of Northwest.

John M. Hodgson, United's v.p.-flight administration, named v.p.-communications. **J. R. Cunningham,** director of communications for 26 years, continues in that capacity and will retire within a year. **D. C. Lynch,** asst. to senior v.p.-flight operations, appointed to new post of aircraft utilization mgr. **N. F. Timper** transferred from asst. to v.p.-flying to flight mgr.-standards, succeeding **L. L. Treece,** named mgr. of flying.

Walter H. Johnson Jr. resigned as Capital's senior v.p.-marketing to become v.p. of McCann-Erickson Advertising. **William J. Murphy,** Capital's Miami sales mgr., named director of marketing. **R. H. Schwank** resigned as director of procurement and supply and was named v.p.-gen. mgr. of Air Distributors Inc., Kansas City. **James Mask,** purchasing mgr., succeeds Schwank, and **K. R. Kuehn** takes Mask's former post.

Dr. **L. G. Lederer,** director of Capital's medical department for 18 years, named medical director of American, effective Nov. 15.

Nicholas Craig retired as president of Icelandic Airlines, and will continue as a consultant to the company.

Howard Boros resigned as v.p. of Pacific and opened a Washington law office.

Capt. **Dennis I. Peacock** promoted by BOAC from mgr. of flight operations to chief of flight operations, succeeding Capt. **T. H. Farnsworth,** resigned. Capt. **John Woodman,** deputy flight mgr. of the Boeing 707 fleet, named chief pilot.

Beverley S. Shenstone, chief engineer of British European Airways, appointed to the airline's board.

Luis Gonzalez, Braniff's sales mgr. in Mexico City, named mgr. in Mexico. Braniff opens service to Mexico City this month.

Frank Bennett, who has been head of Eastern's cost control, appointed mgr. of flight allocation and manpower planning in the operations department.

John F. Barrett, formerly traffic and sales director of Riddle, also a consultant, named U.S. mgr. of Ini Airlines, based in Miami.

Carlos Ramos, gen. mgr. of Aeronaves de Mexico from 1944 to 1959, named managing director in Mexico for Pan American.

Robert Cleciuch promoted by SAS from Cleveland sales mgr. to agency and interline sales mgr. for North America and northern Latin America.

Donald E. Burlingame, with American since 1940, named director of ramp services, a new post.

Organizational changes in Northeast's sales dept.: **E. Daniel Morton** becomes asst. to gen. traffic mgr.; **Charles H. McKenney,** director of traffic; **W. E. Jenkins,** mgr. of ticket offices and passenger handling; **Warren E. Smith,** mgr. of schedule production; **S. C. Srulevitch,** mgr. of schedule planning and market research.

Fred Brill, El Al sales rep, appointed charter officer, a new post.

AMONG THE SUPPLIERS

H. H. Warden, former mgr. of commercial sales for Lockheed-Marietta, appointed sales mgr. of Pacific Airmotive's Burbank aircraft division and PacAero Engineering Corp., a wholly-owned subsidiary.

Harold E. Haynes, Boeing controller, elected v.p.-finance and controller.

Jules C. Laegeler promoted by Frank G. Hough Co. from chief engineer to v.p.-engineering.

James V. Crawford promoted from chief engineer to asst. mgr. of The Garrett Corp.'s AiResearch Mfg. Co. Dr. **John Mason,** chief of preliminary design, becomes chief engineer.

Walker G. Dollmeyer, former v.p. of Solar Aircraft, named v.p.-operations of Lycoming's Stratford plant.

B. F. Coggan resigned as v.p.-special projects of Convair to devote his time to other business interests.

Richard C. Henshaw promoted by Lord Mfg. Co. from operations mgr. to v.p.-operations.

Kenneth W. Brown, who has been v.p.-gen. mgr. of Avro Aircraft Ltd., Canada, named asst. gen. mgr. of Boeing Vertol division.

Promotions by Wilcox Electric: **H. Kenneth Payne** to v.p-operations; **Donald L. Welborn** to v.p.-manufacturing; **James Q. Kohler** to v.p.-purchasing.

William E. Diefenderfer promoted from engineering mgr. to asst. gen. mgr. of Hamilton Standard. **Harry E. Gravlin** named operations mgr. and **Donald G. Richards** engineering mgr.

Dr. **R. L. McCreary,** Collins Radio's research director at Cedar Rapids, will

INSTANTANEOUS
VERTICAL SPEED INDICATOR
with steady readability in turbulence

SPECIALTIES, INC. IVSI*

3000 or 6000 ft./min.-dull white or phosphorescent markings.

IT'S THE SKIPPER'S WORD

"First significant improvement in 25 years—accelerometer actions superimposed on the bleed rate mechanism provides accurate instantaneous instead of false lagging indications."

Captain Charles H. Daudt
American Airlines, Inc.

INSTALLED IN:

1. Hundreds of CORPORATE & PRIVATE AIRCRAFT.
2. Entire AMERICAN AIRLINES JET FLEET.
3. CONVAIR F-106A to help set present WORLD'S SPEED RECORD.
4. Fleets of BOEING 707, CONVAIR 990, & LOCKHEED ELECTRAS.

INSTALLATION REQUIRES ONLY A STATIC SOURCE AND 20 MINUTES TO INSTALL

MAJOR USES

1. Prevents over control
2. Bracket glide slope
3. Eases 45 deg. bank alt. cont'l.
4. Smooths turbulent air
5. Constant landing approach sink rate
6. Eases cruise altitude control
7. Failed horizon replacement
8. Optimum engine failure climb
9. Safer black night takeoff
10. Safer instrument takeoff by monitoring—downdrafts—flap retraction sink—gear retraction sink—horizon acceleration errors
11. Exact descents GCA approaches
12. Exact descents OMNI approaches

WRITE FOR IVSI* DETAILS TO:

Continental Development Corporation

*Trademark P.O. Box 511, Ridgefield, Conn. • IDlewood 8-6964

Research
Responsibility
Results
FROM SATELLITES TO
SAFETY HARNESS . . .
Aerotec Industries' products are helping aviation to set new performance standards. The Aircraft Equipment Division produces advanced controls and disconnects for aircraft, missiles and nuclear applications. The Aerotherm Division, pioneer in the application of Energy Absorption (E/A)* to aircraft seats, manufactures all types of seating. The Industrial Division produces equipment for the cleaning, control and handling of gas and air.
*Trademark
AEROTEC INDUSTRIES
INCORPORATED
EXECUTIVE OFFICES • GREENWICH, CONN.
Plants at Bantam, Greenwich and So. Norwalk, Conn.
Canadian Affiliate: T. C. CHOWN LIMITED, Montreal and Toronto
AEROTHERM DIVISION • AIRCRAFT EQUIPMENT DIVISION • INDUSTRIAL DIVISION

head a new corporate research division to be established in California.

William M. Francullo, formerly with Bulova Research and Development Labs, joins Consolidated Diesel Electric's aircraft equipment division as senior project engineer.

IN THE AGENCIES

G. Ward Hobbs resigned as Capital's v.p.-customer services to become director of FAA's Bureau of National Capital Airports.

John W. Bridges, formerly with Military Air Transport Service, heads a new aircraft fire and rescue program at FAA.

Grace M. Biermann appointed chief of public information for CAB. She has been with the information office since 1944 and with CAB since 1939.

HONORS

William P. Lear Sr., board chairman of Lear Inc., was awarded the Great Silver Medal of Paris for his contributions to aircraft safety. The Lear L-102B autopilot is used on the French Caravelle jet transport.

BOOKS

THE PROBABLE CAUSE, by Robert J. Serling. 287 pages. $3.95. Doubleday & Co., Garden City, N.Y. Robert Serling, Washington reporter for United Press International, handles a delicate subject—airline accidents—with skill. After three years of research, he covers a number of crashes in highly readable, nontechnical detail—how they happened and why. He also discusses in layman's language airline maintenance and overhaul, touches on differences between FAA, carriers, CAB and ALPA, and writes of the work that lies ahead in the air safety field.

There is no sensationalism, as there could easily be in such a book. Instead, the reader is reassured. In the author's words, "Anyone who writes about air crashes is quoting a speech out of context; the real story of U.S. commercial aviation is not one of disaster but of fantastic accomplishments toward greater safety." Recommended reading.

Civil Air Regulations for Mechanics; Aero Publishers, Inc., 2162 Sunset Blvd., Los Angeles 26, Calif.; $4.50. This revised 15th edition contains all FAA regulations applicable to mechanics working on either the airframe or the power plant of an aircraft. It tells what a mechanic can do, must do, or cannot do when constructing, repairing or maintaining an aircraft. Also included are 250 check questions and sample forms.

Design of Concrete Pavements for Airports; Wire Reinforcement Institute, Dept. AP-11, 1049 National Press Bldg., Wash. 4, D.C.; $3.00. This volume has been prepared as a manual to serve as a handy reference for engineers engaged in the design of concrete pavements. It presents design criteria and practices which have evolved over the years, in addition to FAA requirements. Also included is a table of aircraft loadings and landing gear details with sketches of typical layouts. Copies will be sent free to persons writing on business letterhead.

FOR LIFT AND PROPULSION

ROLLS ROYCE

ROLLS-ROYCE power for VTOL

ROLLS-ROYCE OF CANADA LIMITED, BOX 1400, ST. LAURENT, MONTREAL 9, P.Q.

ROLLS-ROYCE LIMITED, DERBY, ENGLAND

AERO ENGINES • MOTOR CARS • DIESEL AND GASOLINE ENGINES • NUCLEAR PROPULSION

Industry Disagrees on Jet Overhaul

Major carriers stick to periodic shop tie-up, but TCA, Continental and Braniff adopt new approach

KANSAS CITY, MO.—A major split in airline thinking on how to best schedule jet aircraft for overhaul is fast shaping up.

Should these expensive, high revenue-producing wonders be taken out of service every 2,500 or 4,000 hours and routed to an overhaul shop for partial overhaul? Or is this five or six-day tie up too expensive a luxury for airline managements to carry over from piston operations?

Would it not be better to parcel out this work over the operating life of the aircraft, accomplishing all required jobs at smaller time intervals? Out of service time could be held to 12 or 14 hours, and the jet would be on hand to haul passengers whenever the sales department needed it.

Conflicting answers to these questions are widening the breech in airline overhaul philosophy. This became evident as top technical officials of the airlines convened here in October for the annual ATA engineering and maintenance conference.

Success at Continental

Trans-Canada's H. J. Heinrich, an outspoken advocate of the "new approach" points to the success of Continental and Braniff in dispensing with the spare airplane in overhaul. Continental, Heinrich notes, holds the distinction of attaining over 12.5 hrs. a day utilization, the best in the industry. It also reports the lowest breakeven load factor with jets at 42%.

CAL's jet fleet has passed the 5000-hr. mark and the carrier foresees no major tie-up before it has reached 10,000 or 12,000 hrs., if then. Braniff has adopted a similar system and with equal success, limiting its 707 out-of-service time to 12 hrs.

The TCA production planner warns of a difficult and somewhat embarrassing shift coming up in the relationship of indirect to direct costs in jet maintenance. Because the high productivity jets handle more business with fewer aircraft flying fewer hours than maintenance facilities were geared to handle, direct costs will drop. But, overhead is on the climb to pay for the buildings and ground equipment bought to support these jets.

Overhead cost puzzle

As a result, Heinrich predicts a shift in the ratio of indirect-to-direct costs from 30-70% to possibly 50-50%. His big question: How can airline maintenance avoid being saddled with 50¢ overhead on every dollar spent on jets.

Preferably the solution is to increase the business volume and increase utilization. This would absorb excess shop capacity and spread indirect costs more widely. The exceedingly painful alternative, says Heinrich, is to slash current levels of overhead. For those who have already built their jet plants, this means personnel reductions principally in supervisory ranks.

Heinrich proposes a three-point program for better airline understanding of jet economics in these major areas:

- Develop a realistic unit for measuring cost performance, one that will pinpoint the contributions of vastly differing fleets of aircraft.
- Develop a system of overhead allocation that will permit true calculation of total operating costs of an aircraft fleet. This would make possible wiser decisions on when to scrap or when to repair, when to subcontract or do it oneself.

Without this yardstick, asks Heinrich, who really knows today when a fleet ceases to be profitable or which services are cross-subsidizing one another?

- Create a method for long-range planning capable of being computerized so that one can study quickly and accurately the many alternatives for conducting future operations.

American Airlines, a subscriber to the base overhaul concept Heinrich would dispose of, averaged 2,042 hours on the 24 Boeing 707s routed through its Tulsa base, S. H. "Sandy" Siegel, AA's overhaul superintendent reveals.

Scheduled work on the 24 aircraft was set at 30,047 manhours and was actually accomplished in 32,614 or 8.5% above the forecast. Non-routine or repair work was expected to run 63,121 manhours but fell 7.4% below this figure at 58,445.

The "average" 707 going through Tulsa showed these results in manhours by type of work:

Routine work	1359.1
Repairs	2435.1
Engineering changes	2163.0
Engine checks	190.8
Total	6148.0

In total cost by work area, the 707 in the dock ran 6148 manhours and

CHABOT

ATA MEETING 1961

Eastern Air Lines' v.p.—maintenance and maintenance engineering, Ambrose L. Chabot, has been named chairman of the 1961 Engineering & Maintenance Conference tentatively set for next October in Miami.

During the next 12 months ATA—sponsored meetings with aircraft and engine manufacturers will be spearheaded by the following carriers:

Allison	American	General Electric	Delta
Boeing	Continental	Lockheed	Northwest
Convair	TWA	P&W	United
Douglas	Eastern	Rolls-Royce	Trans-Canada
Fairchild	West Coast	Vickers	Capital

materials averaged $7017. Airframe support shops averaged 875 manhours and $7893 for materials. Instruments required 670 manhours and $2200 for materials. The flight line consumed 790 manhours. Overall average for the first visit of each 707 was 8484 manhours and $17,110 for material.

Based on good results during the first go-around, AA has been able to extend the time between Tulsa visits from 2400 to 4000 hours. At 10 hours a day utilization, this means about one year between overhauls.

TWA's J. F. Roche, manager of aircraft and systems engineering, reports the 707 is now averaging between 6% and 7% of departures delayed for mechanical reasons, a considerable improvement over the 13% experienced in the first nine months of service. This still exceeds the 4% average for piston types, but the 707 is still improving.

Empennage deicers need attention

Engine water injection system delays, which ran as high as 40 per month last year, have been trimmed to an average of only four or five. But, says Roche, the empennage deicer boots need radical improvement. TWA has had to replace from 80 to 100 boots in some months, a job requiring complete leading edge removal. The elapsed time runs 10 hours and the situation dictates stocking spare leading edges costing $6000 to $8000 each.

Fire detectors are another headache, averaging 0.2 failures per 1000 hrs. The TWA engineer says there is certainly a challenge to the industry in this area to develop a better system. Cockpit windshield panels, being removed at a rate of 0.67 per 1000 hrs., are proving a costly and time consuming problem. Roche pegs the cost of these panels as high as $1150 each and elapsed time for replacement at about eight hours.

In DC-8 operations, United Air Lines' asst. manager-service engineering L. W. Olson reports a noticeable sensitivity of delay performance to modifications made so far to troublesome systems. Like the 707 only more so, windshields on the DC-8 have been a chronic item. After only five months of service, windshield delays hit the roof of UAL's maintenance analysis charts with a rate of 10 per 1000 hrs. However, only nine months later, fixes cut this to one per 1000 hrs.

Similarly, water injection headaches followed the 707 pattern running about eight per 1000 hrs. for the first two months, dropping to less than one as modifications cured the ills. The DC-8 fuel quantity indicating system, also hitting 10 delays per 1000 hrs. early this year, was brought down to negligible levels by August after UAL, Douglas and the manufacturer, Liquidometer Corp., toured the carrier's system with a team attack on its problems.

The pneumatic system on the DC-8 has required 35 modifications to date and the system is slated for 20 more during the next year, according to Olson. It now averages slightly above one delay per 1000 hours compared to four or five in early operations.

Douglas' Walt Winkler says the company has come up with an answer for all problems so far identified on the DC-8. Within the next month, Douglas plans to issue each customer a DC-8 product support master log showing the status of each improvement and providing a master check list for future mods. Winkler reports the industry average last month was 6.4% of all departures delayed.

The Convair 880 is now being inspected on daily checks and turnarounds at manhour goals initially predicted for it, according to Art Ford, Delta's supt. of engineering. A daily requires two men one hour, a turnaround one man for 15 minutes.

Complete Meeting Coverage

The December issue of *AIRLIFT* will continue coverage of the ATA Engineering & Maintenance conference. Look for complete reports on Pan American's jet overhaul experience, operating results with the Rolls-Royce Conway and the effects of Curtiss-Wright's reoriented program on Turbo compound engine operations.

476 fixes for "bugs"

Ford says rumors of excessive fuel consumption on the 880's CJ-805 engines have been exaggerated. Although it has been running 1000 lbs. per hour higher, he expects modifications underway by GE and Convair will meet the original goal. Of 14 off-schedule engine removals to date, only three have been classed as failures.

In Delta's project "de-bug" for the 880, Ford lists 292 modifications issued and 184 under investigation. Here's how they break down:

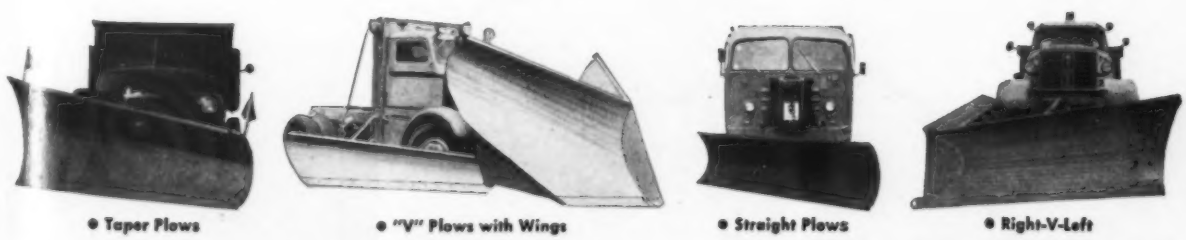
Area	Issued	Investigating
Systems	55	40
Structures	37	34
Elect. & Inst.	89	55
Power pod	47	32
Furnishings	64	23
Total	292	184

Following seven delays in early operation, Delta replaced the original Hamilton Standard hydraulic pumps with Vickers units. Twelve other delays brought a change from 52SO ¼ and 3/8-in. tubing to stainless steel for the hydraulic return system in wheel well and pylon areas.

Despite an increase in the number of takeoffs from 38.4 in the first quarter of 1959 to 133 per airplane this year, the percentage of Lockheed Electra departures delayed for mechanical reasons continues to decrease.

R. A. Barnard, Lockheed-California Div.'s director of parts and services pegs present performance at 4.2%. This is equivalent to accepted piston levels and about two percentage points below the level reported for big jets. Eastern, the largest of Electra operators, is running below the 4% mark in Electra mechanical delays. ■

A SNOW PLOW FOR EVERY SNOW REMOVAL PROBLEM



• Taper Plows • "V" Plows with Wings • Straight Plows • Right-V-Left

THE GLEDHILL ROAD MACHINERY CO., Galion, Ohio

Compact Cooling for Mohawk 240s

VIEWING AIR CONDITIONING package near spot where it will be installed on Mohawk Airlines' Convair 240s is Glenn Irish, director of purchasing.

Compact, packaged air conditioning units designed by Carrier Corp. (Syracuse, N.Y.) have been fitted into Mohawk Airlines' fleet of Convair 240s. Not only will the new equipment provide comfortable cabin temperatures in flight but it will function on the ground from external power or with a single engine operating.

The existing air distribution system must be removed from Mohawk's 240s to make way for the Carrier unit. Weight gain for the entire installation is 151 lbs.

Approximate cost for the total installation in seven aircraft is $152,000. This includes cabin modification, installation of the air conditioning "package" and fitting of a completely new air distribution system. Installation time is working out to be approximately nine days per aircraft.

Mohawk and Carrier began collaboration on the new system in October, 1959, after the airline had experienced difficulty cooling the 240s sufficiently on the ground in hot summer weather. Mohawk engineers designed the air distribution system, patterned around an air conditioning package worked out by Carrier.

The result of this joint endeavor is a freon air conditioning package capable of providing ground cooling and heating with the aid of ground power, cooling and heating with both engines operating, or cooling alone with one engine.

The unit contains a freon compressor, evaporator, condenser, hydraulic drive motor, receiver and flow controls. All but the condenser and recirculating air fans are contained in the package.

The unit measures 60 in. long, 13½ in. wide and 20½ in. high. It may be operated either by electric or hydraulic power. On the Mohawk 240s, the unit operates from hydraulic power supplied by the aircraft's hydraulic system. It delivers 1,100 cu. ft. of refrigerated air per minute.

Write: Dept. A/L, Mohawk Airlines, Inc., Oneida County Airport, Utica, New York.

Cargoveyor

"Cargoveyor" designed for aircraft baggage handling is hydraulically operated, has a 20-in.-wide rubber belt for moving baggage to and from an aircraft. Unit operates from a height of 1 ft. 3 in. to a maximum of 11 ft. 6 in. Model shown has capacity for 580 cu. ft., is mounted on a Morris Commercial 3-ton chassis.

Write: Dept. A/L, Samlesbury Engineering, Ltd., Samlesbury Airfield, Blackburn, Lancashire, England.

Ramp Detergent

Fine Organics' solution F. O.-302, nontoxic, non-inflammable and non-injurious to concrete, asphalt or human skin, is advanced as aid to ramp cleanliness. Material is applied and permitted to penetrate into grease deposits for 15 minutes. Removal is by ramp scrubber and clear water (230 gals. for 10,000 sq. ft.).

Write: Dept. A/L, Fine Organics, Inc., 205 Main St., Lodi, New Jersey.

Ground Power

Hobart Model 3250 ground power unit pictured is used by Japan Air Lines for servicing DC-8s. Model 3250 is self-propelled, sit-down unit designed for use with either piston or jet aircraft. It is rated at 75 KVA or 60KW at 0.8 p.f., 120/208 amp., 3 phase, 4 wire, 400 cps AC.

The generator is driven by a V-8 International industrial engine of 157 hp and 549 cu. in. displacement. Power from the engine propels the equipment at 11 mph.

Write: Dept. A/L, Motor Generator Corp., Troy, Ohio.

Flexible Tubing

Used with de-icing units, tubing can withstand temperatures between –65 deg. and 350 deg. F. Photo shows tubing being used to de-ice jet engines on aircraft parked in the open in freezing weather.

Fifteen-ft. piece of tubing weighs 18 lbs. and can be retracted to 18 in. It is equipped with a special handle for carrying. Outer surface contains "scuff strips" to prevent abrasion damage.

Write: Dept. A/L, American Air Filter Co., Louisville, Ky.

Samlesbury Engineering's "Cargoveyor."

Hobart 3250 ground power unit.

AiResearch Freon service cart.

Freon Service

First unit to service air conditioning systems with both Freon 114 and Freon 12 is available from AiResearch. Equipment evacuates systems under service and refills them with the proper refrigerant. Unit also purges systems with dry nitrogen, adds lubricants, and dehydrates the Freon compressor group.

To date, nine airlines have ordered 32 Freon service carts for use on a variety of aircraft.

Write: Dept. A/L, AiResearch Manufacturing Div. of Los Angeles, 9851 Sepulveda Blvd., Los Angeles, Calif.

Ramp Equipment in Brief

REF Mfg. Corp. is producing a transportable pressure test rig for checking fuel systems on JT-3 and JT-4 jet engines. Unit can be used for testing the fuel system with engine either installed, assembled but not installed, or partially assembled.

Write: Dept. A/L, REF Mfg. Co., 391 Jericho Turnpike, Mineola, L.I., New York.

Both electrical and pneumatic power for ground support of jet aircraft is provided by new AiResearch ground power vehicle, which provides on a single chassis all power required for electrical check-out, ground air conditioning and starting. Gas turbine delivers 116 lbs. of pneumatic power per min. at 98 in. Hg abs.

Write: Dept. A/L, AiResearch Mfg. Div. of Los Angeles, 9851 Sepulveda Blvd., Los Angeles, Calif.

Thermoid-Quaker hose has been used by Pan American as connecting link between ground starters and 707 engines for more than 3,500 starts. Flexible and lightweight, hose coils compactly for storage.

Write: Dept. A/L, H. K. Porter Co., Inc. Thermoid Div., Hose Sales Dept., Tacony and Comly Sts., Phila. 24, Pa.

Hobart 3163 self-propelled ground power unit is now undergoing trial by several airlines at Idlewild. Rated at 125 KVA, O.8 P.F., 3 phase, 4 wire, 400 cps with a GMC Diesel engine, unit has forward control cab only 71 in. high.

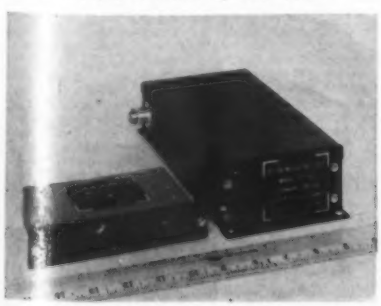
Write: Dept. A/L, Motor Generator Co., Troy, Ohio.

Test Set

An airborne test set designed for preflight or in-flight checkout of IFF transponders or ATC radar beacons—model SC-770—provides go-no go indication. Compact unit weighs less than 3 lbs., consists of interrogator circuitry and control box for instrument panel mounting.

Pilot pushes button to operate. Satisfactory response from transponder flashes indicator lamps. Use of solid state devices insures compactness and minimizes power requirements.

Write: Dept. A/L, Stromberg-Carlson, Public Relations Dept., Rochester 3, New York.



Stromberg-Carlson test set.

NEW! from the TURCO Technical Film Library

FREE SHOWING!

Full Color TRAINING MOVIE

"HOW TO LOCATE FLAWS WITH DYE PENETRANTS"

Accurately — Simply Economically!

Seen and Acclaimed by over 5000 Maintenance, Production and Quality Control Engineers!

SEE: Production-line inspecting of aircraft wing spars!

SEE: In-lathe inspections without disturbing set-up!

SEE: Location of weld porosity in pressure vessels!

SEE: Mass production inspection of small parts!

SEE: Location of fractures in wheels and gears!

SEE: Detection of heat cracks in brake plates!

SEE: a "flaw's-eye" view of how dye penetrants really work through glass!

IN YOUR PLANT or location of your choice!

Now, your plant or technical group can learn the full story of flaw location with dye penetrants. See how dye penetrants provide greater inspection accuracy and speed at lowered cost for hundreds of industrial concerns whose inspection facilities range from huge multi-tank installations down to small $35 inspection kits. Witness *actual* dye penetrant inspections, *right in your own plant* or other location of your choice...all without any cost or obligation!

Produced by the Technical Film Staff of Turco, manufacturer of the Dy-Chek® inspection process, this 23-minute film visually demonstrates *every* aspect of dye penetrant inspecting from laboratory theory to authentic production-line techniques actually filmed on the spot during mass production inspections.

If your plant or technical group is interested, write today without cost or obligation for the Turco "Film Kit" described below.

Rush Coupon for FREE "Film Kit" ...No Obligation!

1 "SNEAK PREVIEW"
– 4-page folder previews film in detail. Developed from producer's original "script." Leads you through each scene...start to finish. Shows how easily you can obtain film – no cost or obligation.

2 "INSIDE DYE PENETRANTS"
– 8-page folder frankly reveals what dye pentrants are and what they are not! Illustrates many successful case histories of dye pentrant use in industry today.

3 "How to perform DYE PENETRANT Inspections"
– 4-page technical folder details every aspect of dye penetrant inspections from precleaning to interpreting results. Contains valuable "Dwell Time Chart."

Send for FREE KIT!

TURCO PRODUCTS, INC.
24600 South Main Street, Wilmington, Calif.
Please send me your FREE "FILM KIT" without cost or obligation.

NAME_____

TITLE_____

FIRM_____

ADDRESS_____

CITY & STATE_____

Offices in All Principal Cities

TURCO PRODUCTS, INC.

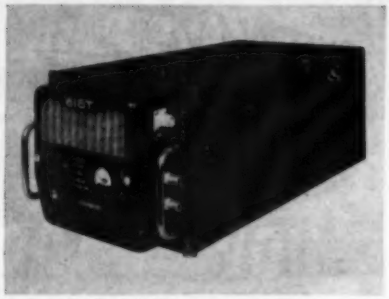
Chemical Processing Compounds
24600 South Main Street, Wilmington, California
FACTORIES: Chicago, Houston, Los Angeles, London, Rotterdam, Sydney, Mexico City, Paris, Hamburg, Montreal, Manila, Naha (Okinawa)

SSB Transceiver

New airborne HF single sideband transceiver—model 618T—provides 28,000 channels, 400 watts peak envelope power on SSB, plus 100-watt carrier for conventional AM. Unit covers 2-30 mc in 1 kc steps. Phase locked circuits assure accurate frequency control, eliminate crystal changing. Channels are instantly selectable on 714E control unit.

Mode selection switch permits use of either upper or lower sideband, or both, for conventional AM. Unit weighs 47 lbs., is housed in 1 ATR case.

Write: Dept. A/L, Aviation Sales, Cedar Rapids Div., Collins Radio Co., Cedar Rapids, Iowa.



Collins 618T SSB transceiver.

Flight Proven

AIRCRAFT SMOKE DETECTION SYSTEM . . .

PYROTECTOR

Proven by more than 30,000 flight hours in airline and corporate aircraft without malfunction, the Pyrotector Smoke Detection system represents a giant step forward in the safety of air travel. Through light reflection principles, Pyrotector units actually, "see" smoke in unguarded areas, and give an alarm before combustion can reach dangerous proportions. As many as six detectors may be connected to one control unit, providing protection for several different baggage and equipment areas with one system. This proven system assures 100% aircraft smoke detection.

APPROVALS

The smoke detection system is certified and approved to FAA, TSO, C1a specifications for "smoke" detection. Pyrotector also manufactures visual detection systems for engine protection, certified and approved to FAA specifications. Write today for complete details. Dept. W

DISTRIBUTED BY: Van Dusen Aircraft Supplies, Inc. • Mid Continent Airmotive Corporation and Pacific Airmotive Corporation.

PYROTECTOR INCORPORATED

Hingham Industrial Center • Hingham, Mass.

FLIGHTEX FABRIC

WORLD'S PREMIER AIRPLANE FABRIC

THE DEPENDABLE SOURCE OF SUPPLY

FOR: AIRCRAFT FABRICS • TAPES • ACOUSTICAL INSULATION

FLIGHTEX FABRICS, INC.

93 Worth Street • New York 13, N. Y.

Leading Manufacturers of Fabrics and Tapes for the Aircraft Industry

INFO FOR THE ASKING

Jet temperatures—Four-page bulletin (GEZ-3011) describes GE indicators for measuring inlet or exhaust gas temperatures in jet engines.

Write: Dept. A/L, General Electric Co., Schenectady 5, New York.

Cost control—Information on how best to tackle high maintenance and overhaul costs is provided in first instalment of *Handbook on Production Planning and Control*, published by IATA Production Planning and Control Group.

Write: Dept. A/L, International Air Transport Association, 1060 University St., Montreal 3.

Silicones—"Silicones Solve Space Age Problems" is theme of eight-page reference work describing applications of silicones in commercial aircraft and in ground support equipment.

Write: Dept. A/L, Dow Corning Corp., Midland, Mich.

Electrical equipment—New booklet describes lighting, measuring, indicating and traffic control equipment for airports. Ask for Bulletin 2724, *Lighting and Control Serving Aviation 24 Hours a Day*.

Write: Dept. A/L, Crouse-Hinds Company, Syracuse 1, New York.

NOTES ABOUT SUPPLIERS

• Marconi AD 2300 doppler navigating equipment at the Centre d' Cssais en Vol has been flown successfully at Mach 2 at high altitude. AD2300 navigators and computers have been ordered for the Mirage IV.

• Aviation products of the Permatex Company, Inc., will be distributed by International Aircraft Services, Inc. (formerly the Babb Co.).

STATEMENT REQUIRED BY THE ACT OF AUGUST 24, 1912, AS AMENDED BY THE ACT OF MARCH 3, 1933, AND JULY 2, 1946 AND JUNE 11, 1960 (74 STAT. 208) SHOWING THE OWNERSHIP, MANAGEMENT, AND CIRCULATION OF AIRLIFT, published Monthly at Harrisburg, Pennsylvania, for November, 1960.

1. The names and addresses of the publisher, editor, managing editor, and business manager are: Publisher, Wayne W. Parrish, Washington, D.C.; Editor, Wayne W. Parrish, Washington, D.C.; Managing Editor, Joseph S. Murphy, Washington, D.C.; Business Manager, Leonard A. Eiserer, Washington, D.C.

2. The owner is American Aviation Publications, Inc., 1001 Vermont Ave., N.W., Washington, D.C.; Stockholders—more than 1%, Wayne W. Parrish, Washington, D.C.; Leonard A. Eiserer, Washington, D.C.; Eric Bramley, Washington, D.C.; Robert R. Parrish, Chicago, Ill.; E. J. Stackpole, Harrisburg, Pa.; Fred S. Hunter, Washington, D.C.; A. H. Stackpole, Harrisburg, Pa.

3. The known bondholders, mortgagees, and other security holders owning or holding 1 percent or more of total amount of bonds, mortgages, or other securities are: None.

4. Paragraphs 2 and 3 include, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting; also the statements in the two paragraphs show the affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner.

5. The average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the 12 months preceding the date shown above was: 14,345.

LEONARD A. EISERER,
(Signature of business manager)

Sworn to and subscribed before me this 2nd day of September, 1960.

RETTA B. LUDDEKE,
Notary Public.

(My commission expires Nov. 14, 1962)

ADVERTISERS' INDEX

Aerotec Industries, Inc., Aerotherm Div. 62
Agency—Doremus-Eshleman Co.

AiResearch Aviation Service Div., The Garrett Corp. 14
Agency—J. Walter Thompson Co.

AiResearch Mfg. Div., The Garrett Corp. 50
Agency—J. Walter Thompson Co.

American Airlines, Inc. 22
Agency—Young & Rubicam, Inc.

Boeing Airplane Co. 3, 40, 41
Agency—Fletcher Richards, Calkins & Holden, Inc.

Braniff International Airways, Inc. .. 16
Agency—Potts Woodbury, Inc.

Bristol Siddeley Engines Ltd. 44
Agency—Young & Rubicam, Ltd.

Canadair Ltd., (Sub. of General Dynamics Corp.) 8
Agency—Erwin Wasey, Ruthrauff & Ryan, Inc.

Collins Radio Co. 4
Agency—W. D. Lyon Co.

Continental Development Corp. 61

Delta Air Lines 48
Agency—Burke, Dowling Adams, Inc.

Douglas Aircraft Co. Inc. 18, 54
Agency—J. Walter Thompson Co.

E. I. Du Pont De Nemours & Co. 15
Agency—Batten, Barton, Durstine & Osborn, Inc.

Flightex Fabrics, Inc. 68
Agency—The Powerad Co.

General Electric, Flight Propulsion Div. 36, 37
Agency—George R. Nelson, Inc.

Gledhill Road Machinery Co. 65
Agency—Chapel and Assoc.

B. F. Goodrich Co., Aviation Products Div. 11
Agency—Griswold-Eshleman Co.

Hawker Siddeley Aviation Div., Armstrong Whitworth Aircraft, Ltd. .. 58
Agency—Batten, Barton, Durstine & Osborn Ltd.

Frank G. Hough Co., The, (Sub. of International Harvester Co.) 56
Agency—Ervin R. Abramson Adv., Inc.

Jack & Heintz, Inc. 12, 13
Agency—Fuller & Smith & Ross, Inc.

Lockheed Aircraft Corp. 6, 7
Agency—Foote, Cone & Belding

Pacific Airmotive 10
Agency—Gaynor & Ducas, Inc.

Phillips Petroleum Co. 71
Agency—Lambert & Feasley, Inc.

Pratt & Whitney Aircraft Div., United Aircraft Corp. 21, 60
Agency—Campbell-Ewald Co.

Pyrotector, Inc. 68
Agency—Meissner & Company, Inc.

Radio Corp. of America, Industrial Electronic Products 52, 53
Agency—Al Paul Lefton Co., Inc.

Resistoflex Corp. 72
Agency—Adams & Keyes Inc.

Rolls-Royce Ltd. 63
Agency—The Wesley Assoc., Inc.

Sikorsky Aircraft Div., United Aircraft Corp. 38
Agency—Campbell-Ewald Co.

Sperry Gyroscope Co., Div. of Sperry Rand Corp. 2
Agency—Reach, McClinton & Co.

Trans World Airlines, Inc. 57
Agency—Foote, Cone & Belding

Turbo Products, Inc. 67
Agency—Van der Boom, Hunt, MacNaughton, Inc.

Vickers Armstrong Ltd. 32, 33
Agency—McCann-Erickson, Inc.

Wilcox Electric Co., Inc. 34
Agency—Valentine-Radford Adv.

THE BULLETIN BOARD

Undisplayed Advertising: $2.00 per line, minimum charge $6.00. Cash with order. Estimate 30 capital letters and spaces per line; 40 small lower-case letters and spaces per line. Add two lines if Box Number is included in lieu of advertiser's name and address.

Displayed Advertising: $20.00 per column inch. Space units up to full pages accepted in this section for classified-type advertising.

Forms close three weeks preceding date of issue. Address all correspondence to Classified Advertising Department, Airlift Magazine, 1001 Vermont Ave., N.W., Washington 5, D.C.

FOR SALE

FOR SALE
SPARE PARTS INVENTORY
for
C-46, DC-4, DC-6, 1049H Constellation Aircraft
also
Wright Compound 3350-EA-3 Engines
Pratt & Whitney R2800 CB16/17 Engines
THE FLYING TIGER LINE
Burbank, California
Call or Cable Doug Duly
Tel.: TRiangle 7-3411 Cable: Flytiger

FOR SALE OR LEASE
Newly overhauled
C46F
Low time
C46As
Call/write for information
AAXICO
Box 875, Miami 48, Fla. (TU 7-1541)

FOR SALE
EIGHT AIRLINE DC-3s
28 seats—G-202A Engines—Air Stair Door
FOR INFORMATION
Glenn W. Irish, Mohawk Airlines, Utica, N.Y.
RE 6-3311

AN FITTINGS & HARDWARE
Stainless, Aluminum, Brass, Steel All sizes—immediate delivery from world's largest shelf stock. Buy direct from manufacturer. Lower prices—quicker service. Send for free wall charts showing complete line of AN & MS fittings and hardware. We machine parts to your own print; also, we sell AN & MS Forgings.
COLLINS ENGINEERING CORPORATION
9050 Washington Blvd., Culver City, California

HELP WANTED

RESEARCH ANALYST

College degree, transportation major preferred; will consider economics, statistics or accounting degrees. Require minimum of two years airline traffic or financial forecasting. New York location. Submit resume and salary desired to **BOX 216, AIRLIFT MAGAZINE,** 1001 Vermont Ave., N. W., Washington 5, D. C.

FOR SALE
LOCKHEED LODESTARS

Wright 1820-56A Engines—HSP 33D50 Props—1350 HP for T.O.—19,500 lbs. Gross Weight—De-icer Boots—Learstar Rudder Tabs—Fuselage Saddles—Sierracin Electrically Heated Windshield—CB Fire Extinguisher—Edison Fire Detection—Sperry Integrated Instrument System—Collins 51R3 NAV—ARC Type 15 NAV—Dual ADF—Collins 17M1-51X1A and ARC 210 Communication System—Bendix RDRIC Radar—2500 VA Inverters—Executive Interior—Divan—6 Seats—Tables—Closet—Lavatory—Complete Galley—Asking $50,000—Spares Available—Brokers Protected.

Contact: Air Transport Department
Continental Can Company, Inc.
Box 791, Morristown, N.J.
Jefferson 8-3070

FOR SALE
C-46F AIRCRAFT
Passenger and Cargo
With or Without
T-Category Kit Installed
Immediate Delivery
The Flying Tiger Line Inc.
Burbank, Calif.
Call or Cable
Fred Benninger
Executive Vice President
Tel: Triangle 7-3411 Cable: Flytiger

For Sale—Complete set of The Official Guide of the Airways, 1929 to 1946. Some volumes are bound. This set constitutes a priceless and scarce record of the history and development of commercial air transportation from its inception. **Price $250.00.** Please write **Box 217, AIRLIFT MAGAZINE, 1001 Vermont Ave., N.W., Washington 5, D.C.**

CONSULTANTS

aci
AVIATION CONSULTANTS, Incorporated
call—
new york *FR 8-5012*
los angeles *MU 1-4163*
. . . the only service of its kind
2550 East Foothill Boulevard • Pasadena, California

Dozen Stops Remain in Unique Airport 'Collection'

By Wayne W. Parrish

What a wonderful time I've had hedge-hopping around the United States in my hobby of trying to land at or take-off from every airport with scheduled airline service! I'm going to miss this roaming around when I knock off the last dozen remaining stops.

Late summer and early fall I completed everything west of the Rockies and most of the midwest. There were St. George and Kanab, Utah, on Bonanza, both stops now suspended. There were Sun Valley, Idaho; Burns and Lakeview, Oregon; and Omak, Wash., on West Coast Airlines. There were Red Bluff and Palmdale, Calif., on Pacific; Riverside and Apple Valley, Calif., on Bonanza, and Catalina on Avalon Air Transport, Inc., flying in a Grumman amphibian from Long Beach Airport to the harbor at Avalon. (If you've never landed on the water, here's your chance.)

With only a couple of airports yet to go west of the Mississippi, the bulk of those remaining are in the southeast part of the country. In the north there are only Morgantown, W.Va., on Capital; Olean, N.Y. on Mohawk; and Islip, L.I., on Allegheny.

I've been to 574 of the 588 airports with scheduled airline service within the continental United States, plus many others now no longer served. Anybody want to better that record?

What a lift it gives the easterner to get out into the Far West! Scenery unlimited. Good people. Fresh air.

Down in southern Utah I had a fine break when John Lindsay of Bonanza happened to be in Kanab. He drove me through Zion National Park one morning, a real treat. I've flown over Zion many times, but it takes on much better perspective and is far more spectacular from the ground. It's a national park which everyone should see. Millions of years of erosion and time have created a fantasy of nature that is outstanding.

Ever seen those vast areas of lava beds in southern Idaho, or the Craters of the Moon national monument? You see a lot of these lava beds flying on West Coast on its Sun Valley local between Salt Lake City and Boise.

And Crater Lake in the mountains of Oregon? What a beautiful sight from the air! My West Coast pilot gave me and the other passengers a fine view of this huge lake with its deep blue water flying between Klamath Falls and Portland. Ever seen Grand Coulee Dam in eastern Washington at night with the colored lights changing as they play on the backside of the huge dam? You'll see it on the West Coast local that flies via Omak.

What impresses me about the west is the number of fine new terminals. There's a good new one at Klamath Falls, Ore., where "Air Express" Jones, a real fine crusader for aviation, met me during the stop there. Idaho Falls, Idaho, has a very excellent new terminal replacing that old log building that served for so many years.

And prepare for a pleasant surprise soon at Salt Lake City. Herb Lucas, chief agent for Western Air Lines, drove me across the field to see the still-unfinished structure. It is built of white onyx stone and brick facing. The main lobby looks out on the field to the east. In the background is the city with the spires of the famous Mormon Temple, and the state capitol dome, and beyond are the mountains. A magnificent view.

Inside the building the west wall is studded with small windows of brilliant stained glass, a truly beautiful architectural touch. Salt Lake City is a conservative city but it has out-done itself with this fine new terminal opening shortly.

And it was at Salt Lake City that I finally got to see United Air Lines' Jetarama in its last showing after touring the country. This was thanks to running into E. L. Dare, UAL's director of cargo development, on my DC-7 from Chicago to Salt Lake City.

I hope United turns over the Jetarama to some worthy city that will keep it as a permanent exhibition. It's just about the finest educational and goodwill air transport exhibit anybody could dream up for the public. It cost United a lot of money but I have a hunch it will pay off handsomely, if it already hasn't done so.

It's a gem for the kids and prospective first-riders who are hesitant to take that first step toward buying an airplane ticket. Whoever thought up Jetarama in United is deserving of highest praise. I'm glad I got to see it before it folded up—although I hope United makes it possible for somebody to keep it operating somewhere. There ought to be one in every major city. ■

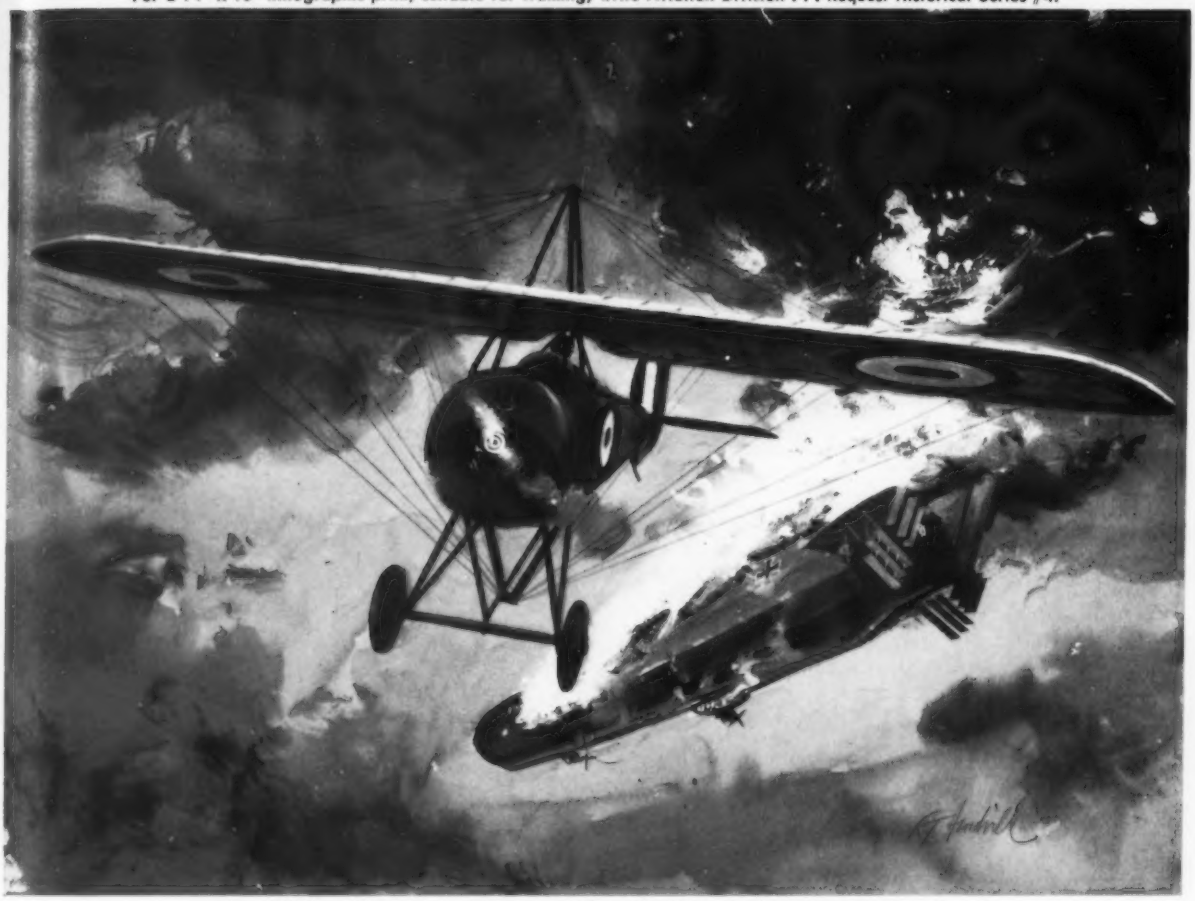
Ed LeShane, station mgr. for West Coast at Boise, Ida.

Wayne Kennedy, left, station mgr. for West Coast, and F. William Schramm, d.s.m. for Bonanza, at Salt Lake City.

George E. Hatch, v.p.-sales of West Coast Airlines, in his Seattle office.

John Lindsay of Bonanza at Zion National Park, southern Utah.

For a 14" x 10" lithographic print, suitable for framing, write Aviation Division . . . Request Historical Series #4.



June, 1915 . . . The first air victory over a Zeppelin, Warneford in a Morane Parasol.

Early War Birds—THE MORANE "L" PARASOL

This World War I two-seater was used in combat by the Allies until the end of 1915. Powered with an 80-horsepower rotary engine, it had a top speed of about 75 mph and an initial rate of climb close to 350 feet per minute. Bomb racks, rifle and machine gun mountings were improvised by squadron fitters to suit the occasion. It was while flying a Morane Parasol that British Navy pilot R. A. J. Warneford downed the German Zeppelin LZ.37.

Just after midnight on June 7, 1915, Warneford and two companions took off to bomb some Zeppelin sheds near Brussels. Their Moranes, with the back seats covered, were each armed with a rifle and six 20-pound bombs. After climbing out, Warneford was searching for his two companions when, to his amazement, he came across a German Zeppelin. Although harassed by German machine gunners, he approached and fired his rifle at the airship. This had no effect, but the Germans played it safe. Water ballast was dropped and the Zeppelin shot up out of reach. Undaunted, Warneford followed, slowly gaining altitude. After about an hour, the Zeppelin headed down for a hole in the cloud layer and Warneford found himself above it. He descended in a flat glide . . . releasing his bombs as he passed over it. The 518-foot Zeppelin exploded and fell earthward as 950,000 cubic feet of hydrogen went up in flames.

On the way back, Warneford was forced down in enemy territory by a broken gas line. He repaired this with the end of a cigarette holder, started the engine again, and flew home, landing about 3:30 A.M.

It was an amazing feat of night flying . . . giving the Allies their first air victory over a Zeppelin. Sub-Lieutenant Warneford was awarded the Victoria Cross.

PHILLIPS 66

● A pioneer in the development of aviation fuels, Phillips Petroleum Company is today a leading supplier of high octane gasoline for commercial, private, and military aircraft . . . and of *super-performance* jet fuels for turboprops and jets. And Phillips research continues to lead the way, developing new fuels for the aircraft of tomorrow.

AVIATION DIVISION • PHILLIPS PETROLEUM COMPANY • BARTLESVILLE, OKLAHOMA

HOSE SHOP OPERATIONS AND EQUIPMENT
1—Simple hand shear cuts hose to desired length.
2—Socketing guide speeds installation.
3—Nipple inserting machine.
4—Elbow jig accurately aligns fittings.
5—Compact field swager compresses socket.
6—Pressure test bench checks out assembly.
7—Cleaning tank flushes assembly with solvent.

Now...the reliability and economy of swaged-fitting hose assemblies can be assured in any hose shop with the RESISTOFLEX Portable Swaging Tool!

Now it is possible to make "factory-quality" Fluoroflex®-T hose assemblies with swaged fittings in any hose shop. The simple, dependable field swaging tool developed by Resistoflex eliminates the need for stocking large inventories of hose assemblies, permits easier scheduling of overhaul and repair requirements with lines made-to-order. Expensive fittings can be salvaged—only the socket need be sacrificed—and the repaired assembly can be reused with complete assurance of full, specified performance.

More and more airline and commercial operations are investigating the advantages of Fluoroflex-T hose assemblies and the reliability and economies offered by the Resistoflex portable field tool. Because positive operating stops are built into the tool, always-correct assemblies are assured. It can be used with the same reliability as factory-assembled products.

Fluoroflex-T, the superior Teflon® hose, is non-aging, has unlimited shelf and service life. It qualifies for service at all temperatures from —65° to +450°F. The Resistoflex Swaged Fitting was first introduced with the original fluorocarbon hose in 1953. Its reputation for reliability stands unchallenged, with millions of assemblies in service and never a blowoff on record.

To assure trouble-free operations, specify Fluoroflex-T for original equipment, retrofit, and repair. Write for complete information today.

ORIGINATORS OF FLUOROCARBON HOSE ASSEMBLIES

RESISTOFLEX CORPORATION

COMPONENTS FOR HIGH-TEMPERATURE AND CORROSIVE SERVICES

Plants **in Roseland, N. J. • Anaheim, Calif. • Dallas, Tex.**
Sales Offices **in major cities**

®Fluoroflex is a Resistoflex trademark, reg. U. S. Pat. Off.
®Teflon is Du Pont's trademark for TFE fluorocarbon resins.